Chapter 5
Conservation Strategy

5.1 Summary

The conservation strategy was designed to meet the regulatory requirements of ESA and the NCCP Act and to streamline compliance with CEQA, NEPA, and other applicable environmental regulations (see discussion in Chapter 1). The conservation strategy provides mitigation for impacts on covered species on the basis of species and habitat needs. The conservation strategy mitigates all of the impacts described in Chapter 4, including direct, indirect, temporary, and permanent impacts. To meet the NCCP Act permit standards, the conservation strategy also contributes to species recovery to help to delist the listed species and prevent the listing of non-listed species through the protection, restoration, and enhancement of natural communities and species habitat. The conservation strategy also achieves the objectives listed below, pursuant to the NCCP Act (Section 2820).

- Conserves, restores, and provides for the management of representative natural and semi-natural[1] landscapes.
- Establishes reserves that provide conservation of covered species within the study area (i.e., contributes to species recovery) and linkages to adjacent habitat outside the study area.
- Protects and maintains habitat areas that are large enough to support sustainable populations of covered species.
- Incorporates in the reserves a range of environmental gradients and high habitat diversity to provide for shifting species distributions in response to changing circumstances.
- Sustains the effective movement and interchange of organisms between habitat areas in a manner that maintains the ecological integrity of the Reserve System.

Because the conservation strategy achieves the standards of the NCCP Act to contribute to species recovery, the strategy therefore exceeds the mitigation standards of the ESA. 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 3 and **Appendix D**).

[1] A semi-natural landscape is defined as one that is disturbed by human activity but still provides important habitat for a variety of native species.

The conservation strategy is born out of the biological goals and objectives developed for the Plan and 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 following.

- Create a Reserve System by Year 45 of the permit term that will preserve a minimum of 42,695 acres and an estimated 45,000 acres of newly acquired land for the benefit of covered species, natural communities, biological diversity, and ecosystem function.
- In addition to newly acquired land, incorporate 13,000 acres of existing open space into the Reserve System to enhance their long-term management. The total size of the Reserve System will be at least 55,695 acres and up to an estimated 58,000 acres.
- Protect over 100 miles of streams.
- Preserve major local and regional connections between key habitat areas and between existing protected areas.
- Establish a framework for long-term management of the Reserve System and streams throughout the permit area to enhance populations of covered species and maintain biological diversity.
- Restore or create a minimum of 90 acres and up to 566 acres of riparian woodland, wetlands, and ponds to offset losses of these land cover types and contribute to species recovery. All restoration construction will be completed by Year 40.
- By Year 40, restore a minimum of 1.0 mile of streams and up to 12.6 miles of streams to offset stream impacts and contribute to the recovery of covered species.

All of these actions will be accomplished by the Implementing Entity with partnerships with the Permittees and the state and federal government (see Chapter 9 for funding and land acquisition partnerships). This chapter does not describe avoidance and minimization actions; these and all other conditions on covered activities are addressed in Chapter 6.

5.2 Framework

The conservation strategy was designed using a multi-scale approach in accordance with principles of conservation biology. At the largest scale, biological 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 level*, generally at the scale of miles or tens of miles. At the middle level, 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 level

addresses the specific needs of covered 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 levels and to ensure that all the needs of particular species are addressed.

This framework for the conservation strategy follows the multi-scale structure and approach advocated by Hunter (2005) that combines "coarse filter conservation," "meso-filter conservation," and "fine-filter conservation" (see **Figure 5-1**).

The conservation actions are described in Section 5.3 *Conservation Actions*; they are divided into land acquisition actions and actions at the natural community and species levels. All conservation actions are designed to have enough detail and specificity to allow implementation. Because of the large scale of this Plan and its long timeframe, 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. Preserving this flexibility is an important part of the conservation strategy.

Implementation of many actions will require the preparation of site-specific implementation documents. These plans will be prepared during Plan implementation after land is acquired and specific restoration and management needs are determined. Reserve unit management plans will guide activities within specific reserve units. Reserve units are defined as groups of contiguous or neighboring parcels that have similar natural communities, covered species, and infrastructure and therefore similar management issues. Reserve unit management plans for individual reserve units will be completed within 5 years of the first acquisition of the land for that reserve unit and submitted to the Wildlife Agencies for review and approval.

All conservation actions will be implemented using an adaptive management approach that is closely tied to long-term monitoring (see Chapter 7 *Monitoring and Adaptive Management Program*).

5.2.1 Biological Goals and Objectives

The Implementing Entity will achieve landscape, natural community, and species-level goals and objectives. Goals are broad, guiding principles based on the conservation needs of the resources. Biological objectives are expressed as conservation targets or desired conditions. Objectives are measurable and quantitative when possible; they clearly state a desired result and will collectively achieve the biological goals **Figure 5-2**). Biological goals for covered species are required by USFWS's *5-Point Policy* to be included in HCPs (65 FR 35242, June 1, 2000)[2].

[2] Due to the scope of this Plan, it was not possible to develop biological goals and objectives that strictly adhered to the Service's and NMFS' 5-Point Policy requirements as described in 65 FR 35251. That is, despite best efforts, the

All the biological goals and objectives on which this Plan is based are presented in **Tables 5-1a through 5-1d**. The conservation actions in this chapter contain detailed information on all aspects of reserve acquisition and management. They provide a strategy for how the goals and objectives will be achieved. It is expected that many of the details of the conservation actions will be modified during Plan implementation through the monitoring and adaptive management program, while goals and objectives will remain relatively static.

The 21 biological goals and 94 objectives in **Table 5-1** are organized by level: landscape level (**Table 5-1a**), natural community level (**Table 5-1b**) and species level (**Tables 5-1c and 5-1d**). At the species level, wildlife and plants are separated in order to make the tables more accessible. The 135 conservation actions that were designed to achieve each objective are shown in **Tables 5-2a and 5-2b**. **Table 5-2a** lists sequentially all land acquisition actions; **Table 5-2b** lists all management actions, broadly defined. One conservation action may contribute to multiple objectives or goals.

In some cases, conservation actions include the phrase "biologically appropriate" or "biologically feasible". These phrases were added to conservation actions such as plant occurrence creation (see Section 5.3.1 Subsection *Incorporating Covered Plant Species* for the definition of a plant occurrence) that are highly dependent on site conditions and other ecological contexts. These conservation actions will be implemented unless the Implementing Entity, with the concurrence of the Wildlife Agencies, determines based on further evaluation that the action is not biologically appropriate or biologically feasible but the biological goals of the Plan would still be fulfilled by implementing a more effective conservation action.

If the agreed upon conservation actions cannot be implemented and there are no alternatives that provide similar benefit and will achieve the biological goals, as agreed to by the Wildlife Agencies and the Implementing Entity, then coverage of the target species may need to be modified, reduced, or eliminated according to the process described in Chapter 10, Section 10.3 *Modifications to the Plan*.

Process of Developing Biological Goals and Objectives

The biological goals and objectives were initially developed through a series of six workshops composed of key technical staff from ICF Jones & Stokes, experts from the Wildlife Agencies, biologists and species experts from SCVWD, Local Partner staff, and outside species experts.

The purpose of each workshop was to collaboratively develop working draft biological goals and objectives. Each workshop began with an overview of the relevant natural communities and species, including key threats, ecological

scope of the Plan precluded the Applicants from developing biological objectives that in all instances included species or habitat indicators, locations, actions, quantify/state, and timeframe. This information is presented in this chapter, which will be supplemented by implementation plans that will be reviewed and approved by the Wildlife Agencies (i.e., reserve unit management plans).

needs, and issues for the conservation strategy (e.g., potential conflicts with other species) by technical experts. Participants then worked through a set of preliminary draft goals and objectives developed by ICF and provided to participants prior to the workshop. Follow-up web-based conference calls or meetings were held at least once for every workshop to refine the goals and objectives to a point where all meeting participants were satisfied.

Every effort was made to create biological objectives that were quantitative as well as measurable. Workshop participants acknowledged that quantitative biological objectives may be somewhat subjective, but at least these quantitative objectives are explicit, clear, and transparent, and they serve as a starting point for conservation actions in the study area, including adaptive management and compliance monitoring (Margules and Pressey 2000).

Goals and objectives were frequently refined and updated as new analysis or new information was developed. In some cases, several possible quantitative targets emerged for an objective. These were carried forward as alternative approaches to meeting the same goal, and formed the basis for the alternative conservation strategies that preceded the selected conservation strategy. Biological goals and objectives were developed using the primary sources listed below.

- Ecological data from species accounts (**Appendix D**) and natural community descriptions (Chapter 3).
- Existing conservation targets or management recommendations for covered species in state or federal recovery plans or status reviews (Hays et al. 1999; U.S. Fish and Wildlife Service 1998a, 1998b, 1998c, 2002, 2006a).
- Other sources with conservation targets or conservation recommendations that address the covered species or the study area (Harrison et al. 1988; Weiss 1999; California Partners in Flight 2002; Klute et al. 2003; Ehrlich and Hanski 2004; Haight et al. 2004; Riparian Habitat Joint Venture 2004; Hamilton 2004; Trenham and Shaffer 2005; The Nature Conservancy 2006a).
- Critical habitat maps and data in published critical habitat rules for covered species (U.S. Fish and Wildlife Service, 2005, 2006b, 2008, 2010).
- Habitat distribution models developed for most of the covered species (see Chapter 3 and **Appendix D**).
- Results of the conservation gap analysis (see below).
- Input from resource specialists outside workshops including staff from the Wildlife Agencies.

When developing quantitative objectives, workshop participants recognized that conservation encompasses both mitigation and the need to contribute to species recovery. The level of this contribution to recovery was based, in part, on the proportion of the species' range within the study area. Quantitative biological objectives were established on the basis of relevant species-specific data. When data were not available, general guidelines or conservation "rules of thumb" were used to help establish quantitative biological objectives on the basis of the

proportion of the species' current range within the study area (Margules and Pressey 2000) (**Table 5-3**).

Conservation of ecological processes, environmental gradients, regional biological diversity, and regional wildlife linkages were addressed primarily in the landscape-level biological goals and objectives. These goals and objectives were inherently difficult to develop because of the large scale of the processes and the general lack of data regarding their operation in the study area. The land cover mapping described in Chapter 3 was assumed to be an adequate surrogate for regional biological diversity. If adequate and representative stands of all of these land cover types are preserved and enhanced, it is assumed that native biological diversity in general will be preserved and enhanced.

Biological Goals

Most of the biological goals and objectives are designed at least to conserve current populations of covered and other native species in the study area. In some cases, populations of covered species are expected to increase as a result of land preservation, improved water management, habitat enhancement, habitat restoration, and habitat creation.

Goals are listed below by level (see **Tables 5-1a through 5-1d**): landscape level, natural community level, and species level. The biological goals apply only to the Reserve System unless stated otherwise. Though most conservation actions will occur within the Reserve System, similar conservation approaches on private lands outside of the Reserve System will be encouraged during implementation. In cases where species conservation will occur outside the Reserve System (e.g., stream and riparian restoration), biological goals apply to the study area as a whole.

Landscape-Level Goals (Table 5-1a)

- **Goal 1a.** Protect and maintain natural and semi-natural landscapes.
- **Goal 1b.** Protect and maintain ecological (natural) processes.
- **Goal 2.** Maintain or improve opportunities for movement and genetic exchange of native organisms within and between natural communities inside and connecting to areas outside the study area.
- **Goal 3.** Enhance or restore representative natural and semi-natural landscapes to maintain or increase native biological diversity.

Natural Community–Level Goals (Table 5-1b)

- **Goal 4.** Maintain and enhance functional grassland communities that benefit covered species and promote native biodiversity.

- **Goal 5.** Maintain and enhance functional chaparral and northern coastal scrub communities to benefit covered species and promote native biodiversity.
- **Goal 6.** Maintain and enhance functional oak woodland communities to benefit covered species and promote native biodiversity.
- **Goal 7.** Maintain and enhance functional conifer woodland communities to benefit covered species and promote native biodiversity.
- **Goal 8.** Improve the quality of streams and the hydrologic and geomorphic processes that support them to maintain a functional aquatic and riparian community to benefit covered species and promote native biodiversity.
- **Goal 9.** Maintain a functional riparian forest and scrub community at a variety of successional stages and improve these communities to benefit covered species and promote native biodiversity.
- **Goal 10.** Maintain, enhance, and create or restore functional pond, freshwater perennial wetland, and seasonal wetland habitats that benefit covered species and promote native biodiversity.

Species-Level Goals (Tables 5-1c and 5-1d)

- **Goal 11.** Improve the viability of existing Bay checkerspot butterfly populations, increase the number of populations, and expand the geographic distribution to ensure the long-term persistence of the species in the study area.
- **Goal 12.** Maintain or increase the breeding population of golden eagles in the study area.
- **Goal 13.** Increase the size and sustainability of the breeding population and increase the distribution of breeding and wintering burrowing owls in the study area.
- **Goal 14.** Increase the ability of San Joaquin kit fox to move into and within the study area and provide habitat to increase the likelihood of breeding.
- **Goal 15.** Provide for the expansion of a breeding population of least Bell's vireos into the study area and increase reproductive success of least Bell's vireo.
- **Goal 16.** Conserve existing populations of the foothill yellow-legged frog population where possible and increase the overall population of foothill yellow-legged frog in biologically appropriate locations in the study area.
- **Goal 17.** Conserve existing populations of California red-legged frog, California tiger salamander, and western pond turtle where possible, and increase the number of individuals and expand the overall distribution of populations of these species in biologically appropriate locations within the study area to maintain viable populations and contribute to the regional recovery of these species.

- **Goal 18.** Increase the population size of tricolored blackbird to enhance the viability of the species in the study area.
- **Goal 19.** Provide for the expansion of a breeding and foraging population of Townsend's western big-eared bat into the study area.
- **Goal 20.** Maintain viability, protect, and increase the size and number of populations of covered serpentine plant species, including Coyote ceanothus, Santa Clara Valley dudleya, Metcalf Canyon jewelflower, most beautiful jewelflower, smooth lessingia, fragrant fritillary, Mt. Hamilton thistle, Loma Prieta hoita, and Tiburon paintbrush, within the study area.
- **Goal 21.** Protect and increase the size and number of covered non-serpentine plant populations to maintain viability of San Francisco collinsia, and Loma Prieta hoita within the study area.

5.2.2 Avoidance and Minimization Measures

As required by ESA, the Plan includes measures to avoid or minimize direct take of covered species. The primary focus of these measures is to avoid or minimize take of *individuals* of covered species (i.e., death or injury to species) and of high-quality habitat, such as streams and riparian areas that may be affected by covered activities. Others forms of take (e.g., harm or harassment of covered species) will still occur.

For example, an intent of certain measures is to encourage individuals of covered wildlife species to avoid or escape project construction zones. Occurrences of covered plants will also be avoided when adequate conservation of these species is not available within the Habitat Plan Reserve System. Activities within streams will be carefully designed and implemented to minimize their effects on this important resource and habitat for covered species. Impacts will also be minimized by requiring development projects adjacent to the Reserve System to be designed in ways that reduce their impacts on covered species and natural communities (as described in Chapter 6).

Areas designated for conservation and described in this chapter include substantial amounts of high-quality habitat for covered species and of natural communities, as well as areas important for maintaining regional biological diversity. Covered activities that result in permanent impacts are anticipated to occur primarily in areas with low-quality habitat. This *regional avoidance and minimization approach* to conservation of land cover and species habitat reduces the need to avoid or minimize impacts on habitats at the small or project scale. Avoidance and minimization measures at the landscape level are accordingly built into the Plan. Most habitat preservation and enhancement will be concentrated away from covered activities in the high-quality habitat of the proposed Reserve System. Avoidance and minimization measures that apply to covered activities are described in detail in Chapter 6.

5.2.3 Reserve System

Land preservation is an important component of this conservation strategy. The term *land preservation* is intended broadly to specify the acquisition of terrestrial and aquatic land cover types. Land will be acquired from willing sellers in fee title or through establishment of conservation easements to create the Habitat Plan Reserve System. Land acquisition mechanics and processes are described in more detail in the Section 5.3.1 *Land Acquisition and Restoration Actions*. Because management of water takes place both inside and outside the Reserve System, specific acquisition and management priorities related to aquatic habitat are described in Section 5.2.4 *Aquatic Habitat Protection and Enhancement.*

Reserve Design Process

The process for delineating and prioritizing land for acquisition corresponds to the scalar approach of the conservation actions (landscape-level, natural community-level, and species-level). First, consideration was given to large, core reserves that could accommodate large blocks of key land cover types (e.g., serpentine grassland) and covered species with large geographical ranges and specific habitat needs (e.g., areas with high densities of ponds to accommodate covered amphibians and reptiles). This level of design also considered expanding existing conservation lands to create larger core reserves. Linkages were also considered so that habitat connectivity goals and objectives could be met (see discussion below). Next, the conservation of rare land cover types (e.g., ponderosa pine and knobcone pine woodland) was considered. Finally, the conservation of species with small ranges was considered (e.g., covered plants). For resources not protected by the core reserves or the habitat linkages, smaller, "satellite" reserves will be proposed when necessary to protect isolated but important resources such as occurrences of covered plants and rare land cover types. In all cases, the Reserve System was designed to adhere to the reserve design principles discussed below with the least amount of acreage in order to efficiently achieve the conservation targets.

Land use and economic factors in the Reserve System design were also considered in a step-wise manner. The first draft maps of the proposed Reserve System considered biological goals and objectives and maximized conservation benefit with the minimum amount of land. The second iteration of the maps took into account relevant land use and broad financial considerations. For example, areas with larger parcel sizes were selected over areas with very small parcels, all else being equal, due to the higher per-acre cost of small parcels. Areas without extensive rural development were favored over areas with such development, all else being equal, due to the habitat incursions and edge effects around rural development. In cases where the conservation priorities overlapped with covered activities, alternative conservation sites were sought. If an alternative conservation site was not available, then the covered activity was scaled back or dropped to allow for the conservation to occur. For example, urban development has been limited along stream corridors to ensure adequate conservation of stream and riparian systems (see Chapter 6, Condition 11 *Stream and Riparian*

Setbacks). This step-wise approach enabled the proposed Reserve System to be developed independently from the covered activities but in a manner that quickly identified and resolved conflicts between them.

The independent Science Advisors and stakeholders provided early feedback on draft reserve design and assembly principles and the preliminary reserve design process. Reserve design alternatives were reviewed by all of the major land management and conservation organizations in the study area: County Parks, Open Space Authority, State Parks, The Nature Conservancy, and the Peninsula Open Space Trust, as well as staff from the Wildlife Agencies. Their valuable input was incorporated into the conservation strategy presented here.

Reserve Design and Assembly Principles

The reserve design process utilized scientifically accepted tenets of conservation biology in concert with the best available biological data (Noss et al. 1995). Information on species (e.g., population biology, genetics, distribution, life history characteristics) and information on habitats (e.g., distribution, composition, ecological functions) informed the reserve design process. Relevant ecological data for covered species are summarized in the species accounts in **Appendix D**.

To be successful, a reserve system must be designed in consideration of multiple ecologically relevant spatial levels. Most small- and medium-level considerations are driven by the needs of covered species and natural communities. For example, at a small level, a reserve system must contain the microhabitats necessary for local populations of the species to survive. At a medium level, habitat patches must be large enough to support populations or important portions of populations of species and the seasonal movement of species (e.g., aquatic habitat for winter breeding of amphibians and upland habitat for non-breeding periods). At a larger level, natural communities must be well represented, and reserves must be linked to allow movement of species for genetic exchange and for recolonization following local extirpation. Biological goals and objectives pertaining to the acquisition and management of the Reserve System were developed at these three levels as discussed above (Section 5.2.1 *Biological Goals and Objectives*).

In addition to the biological goals and objectives, the principles of conservation biology summarized below (Soule and Wilcox 1980; Soule 1986; Primack 1993; Noss et al. 1997; Margules and Pressey 2000; Groom et al. 2006) were used as design criteria for the Reserve System. The reserve design and assembly principles must also be used to assemble the Reserve System during Plan implementation.

- **Maximize Size Efficiently.** The Reserve System will be as large as possible within funding and management limits. It must be large enough to mitigate impacts of covered activities and contribute to the recovery of covered species in the study area. A large reserve system is important to ensure viable populations or portions of populations of covered species, to maximize

protection of species sensitive to disturbances from adjacent land use, and to maximize the protection of biodiversity. Large reserves tend to support more species for longer periods of time than small reserves. Large reserves are also generally easier to manage on a per-acre basis because, for example, a large reserve reduces conflicts that may arise when managing for covered species with very different habitat requirements. Large reserves also better allow for large-scale management treatments such as prescribed burning and livestock grazing and the maintenance of natural disturbance regimes such as flooding. The only way to maximize size within funding and other constraints is to protect areas efficiently.

- **Preserve Irreplaceable and Threatened Resources.** Irreplaceability is a measure of the degree to which conservation goals can be met by preservation of multiple sites. A site with high irreplaceability has unique species or natural communities that cannot be preserved or restored elsewhere. An example of an irreplaceable resource in the study area is serpentine grassland, which cannot be replaced elsewhere once lost. Threatened resources are those most under threat from natural or anthropogenic factors. The reserve system will first protect biological diversity and natural communities that have a high level of irreplaceability and a high degree of threat.

- **Preserve the Highest-Quality Communities.** The reserve system will preserve the highest-quality natural communities and habitat for covered species in the study area. *Highest quality* is defined using various parameters and differs according to community type, but highest-quality habitats are frequently characterized by a high abundance and diversity of native species, intact natural processes, and few roads or other evidence of human disturbances. Degraded communities may need to be preserved as well to capture unique habitats or populations of covered species, to link preserve areas together, or to provide opportunities for land cover restoration required by this Plan.

- **Preserve Connectivity.** The reserve system will link existing protected areas and proposed reserves inside and outside the study area to maximize habitat connectivity. This will maintain and enhance the ability of organisms to move between reserves; facilitate exchange of genetic material, species migration, dispersal, and colonization; and increase the integrity of the network of reserves (e.g., reducing the extent of reserve edge that is in contact with adjacent land uses). Linking reserves may require acquisition of disturbed habitats that can be restored to facilitate better habitat and wildlife movement value. A single large reserve is generally better than several small, linked reserves of equal area in the context of maintaining viable populations of species. In some cases, however, small or isolated reserves are necessary to protect certain features or populations with high biological importance (e.g., covered plant species populations, unique or especially diverse land cover types such as serpentine grassland or scrub). Preserving connectivity will also tend to minimize habitat fragmentation.

- **Minimize Edge.** The reserve system will share a minimum amount of edge (i.e., will have the greatest possible area-to-perimeter ratio) with non-preserve land, especially urban development, to minimize the indirect effects

of adjacent land uses on the preserve resources and to minimize management costs. For example, preserves will tend toward round or square configurations rather than long and narrow ones. In some cases, however, preserves with low area-to-perimeter ratios may be appropriate to protect linear features with high biological value, such as streams, riparian woodland, valley bottoms, or ridgelines essential to wildlife movement.

- **Buffer Urban Impacts.** When adjacent to existing urban areas or planned urban areas (i.e., areas zoned for urban development), the reserve system will include buffer lands within its boundaries. The purpose of this buffer land is to reduce indirect effects on covered species and natural communities from urban development and to provide a zone for fuel load management to reduce the risk of wildland fire spreading to adjacent development[3]. The size of the buffer will depend on site-specific conditions such as topography, the intensity of adjacent urban development, the natural community being separated from the development, the condition of the buffer lands, and whether covered species are or will be present near these lands. (See the section on *Buffer Zones within the Reserve System* below and Condition 10 *Fuel Buffer* in Chapter 6.)
- **Fully Represent Environmental Gradients.** The reserve system will include a range of contiguous environmental gradients (e.g., topography, elevation, soil types, geologic substrates, slopes, and aspects) to allow for shifting species distributions in response to catastrophic events (e.g., fire, prolonged drought) or anthropogenic change (e.g., global warming).
- **Consider Watersheds.** The reserve system will include a full range of catchment types, including watersheds, subwatersheds, and headwater streams that are not already in protected status; this approach can help to maintain ecosystem function and aquatic habitat diversity.
- **Consider Full Ecological Diversity within Communities.** The reserve system will reflect the full ecological diversity within natural communities (e.g., species composition, dominant species, physical and climatic factors) in order to maintain sufficient habitat diversity and species and population interactions. This principle is also called *representativeness* and *comprehensiveness*. Some of the diversity within each of the Habitat Plan land cover types is described in Chapter 3.
- **Consider Management Needs.** Reserves will be manageable. That is, desired management treatments such as livestock grazing, prescribed burning, or invasive species control must be feasible on the reserve units and within the reserve system. In general, larger reserves are easier to manage on a per-acre basis, but other factors such as adjacent land uses, topography, and parcel configuration must also be considered. Management needs may be driven by factors on or off site (e.g., adjacent land uses, watershed processes such as upstream erosion or ongoing contamination).

[3] Consistent with California Public Resources Code 4291.

Requirements of Covered Species

The Reserve System is intended to preserve and in many cases enhance populations of covered species. The ecological information used to determine the needs of covered species is summarized in the species accounts (**Appendix D**) and in this chapter.

All Covered Species

The principles listed below, which apply to all covered species, were used to design the Reserve System and will be used to assemble the Reserve System during implementation.

- **Protect Multiple Populations of Covered Species.** In order to maintain viable populations of covered species, multiple populations of covered species will need to be protected and linked through existing or new protected lands to reduce the risk of local extirpation and ensure the genetic connectivity of populations. This is especially important for species that may function as metapopulations[4] or for species that naturally occur at low density or small population sizes.
- **Protect Higher-Quality Habitat for Covered Species.** Habitat Plan reserves were designed to protect the highest-quality habitat for covered species and allow most impacts to occur in lower-quality habitat.
- **Protect Suitable but Unoccupied Habitat for Covered Species.** Protecting suitable but unoccupied habitat for covered species creates opportunities to enhance habitat through improved management, attracting species to new areas and expanding their ranges and population sizes. Protecting unoccupied habitat also allows for future shifts in populations in response to natural and anthropogenic environmental change.

Consistent with the reserve design approach described above, the needs of covered species were considered at the landscape and habitat levels, and then independently at the species level to ensure that each species' biological goals and objectives would be met. The conservation strategy in this Plan applies a "multi-species umbrella" approach (Lambeck 1997), where the species selected as covered species are the ones in the study area most under threat (i.e., those already listed or most likely to become listed during the permit term).

Bay Checkerspot Butterfly

Early in the development of this Plan, it was recognized that one covered species, Bay checkerspot butterfly, would greatly influence the design of the Reserve System, particularly for the serpentine grassland land cover type. Because the

[4] A *metapopulation* is a group of partially isolated populations belonging to the same species that are connected by pathways of immigration and emigration. Exchange of individuals occurs between such populations, enabling recolonization of sites from which the species has recently become extirpated (locally extinct).

study area supports all of the known populations and individuals of this subspecies throughout its range, a relatively high conservation target was set to protect it so that this Plan could contribute substantially to its recovery (**Table 5-1c**). Many of the serpentine plant occurrences also coincide with habitat for Bay checkerspot butterfly. In this sense, Bay checkerspot butterfly serves as an umbrella species[5] for many serpentine plants. For these reasons, the reserve design process began by determining the preservation needs of Bay checkerspot butterfly.

The reserve design for this species was a major focus of discussion at the biological goals and objective workshop held for serpentine species. The reserve design for Bay checkerspot butterfly had the benefit of extensive previous research and recommendations for specific reserve design strategies (e.g., Thomas Reid Associates et al. 1985; Harrison et al. 1988; Murphy 1988; Weiss et al. 1988; Murphy et al. 1990; Hanski et al. 2004). In addition, the USFWS Recovery Plan and revised critical habitat designation recommend specific land acquisition actions that could result in delisting of the subspecies (U.S. Fish and Wildlife Service 1998c, 2008). Many of these recommended actions were incorporated into the conservation strategy.

Existing Conservation Lands in the Reserve System

An estimated 177,358 acres, or 34% of the study area, are protected as Type 1, 2, 3, or 4 open space. These areas are already owned by public agencies or private conservation organizations or are subject to private conservation easements (**Figure 2-3**, **Table 2-2**, and **Table 5-4**). Type 1 open space is protected in perpetuity for the specific purpose of managing and protecting ecological integrity. Type 2 lands are also managed for the preservation of ecological integrity, but are not protected in perpetuity. Although ecological protection is not the primary management goal, Type 3 open space lands still provide some level of ecological value and function. Type 4 open space lands are not managed for ecological integrity and they offer little or no long-term or measurable ecological value. (See Chapter 2, Section 2.2.5 *Protection and Resource Management Status of Open Space Lands* for more discussion and examples of open space types.)

The Reserve System was designed to take advantage of the substantial amount of open space land already conserved within the study area. Existing Type 2 or 3 open space in the study area that contributes to the biological goals and objectives of the Plan are proposed for inclusion in the Reserve System as *existing conservation lands.* Enrolled existing conservation lands must conduct their management and monitoring according to the requirements and guidelines outlined in this conservation strategy and in Chapter 7 *Adaptive Management and Monitoring Program*. In many cases, this new obligation represents a substantial improvement over the type and level of habitat and species management and

[5] *Umbrella species* are species whose occupancy areas are large enough and whose habitat requirements are broad enough that, once protection is established, it will bring other species under that same protection (e.g., Lambeck 1997; Fleishman et al. 2000; Rubinoff 2001).

monitoring practices that are currently in place. In other cases, this requirement will simply standardize management and monitoring to provide a cohesive reserve system throughout the study area, and ensure consistent management and monitoring in perpetuity. This upgrade and standardization of management and monitoring on existing conservation lands therefore constitutes an important part of this conservation strategy.

To determine which existing open space would be eligible for the Reserve System, the criteria listed below were applied to all existing Type 2 or 3 open space.

- The site contributes to the biological goals and objectives of this Plan and meets many of the reserve design principles described above.
- The site provides clear opportunities for habitat enhancement that would provide substantial benefits to one or more covered species.
- The site is owned by one of the Permittees and the management agency cannot afford to conduct biologically appropriate habitat management, enhancement, or long-term monitoring.
- Land uses on and surrounding the site are compatible with the management and monitoring required by the Plan (e.g., if the site is small, adjacent land uses will not preclude use of necessary management actions).

Existing Type 2 or 3 open space sites proposed for inclusion in the Reserve System are listed in **Table 5-5** and illustrated on **Figure 5-4**. This table also lists how these areas will be enhanced and how they will contribute to the biological goals and objectives of the Plan. **Table 5-5** lists eight park units owned by County Parks. State Park lands were also considered for the Reserve System but were not included because that agency declined to participate in this Plan as a Permittee. Lands owned by the Open Space Authority are also being considered for inclusion in the Reserve System.

For a site to qualify and receive credit as part of the Reserve System, the Implementing Entity will obtain a conservation easement or similar mechanism that is approved by the Wildlife Agencies over these lands. The conservation easement (or similar mechanism) will ensure that these lands are managed and monitored in perpetuity as part of the Reserve System and in accordance with the terms of the Habitat Plan (see Chapter 8, Section 8.6.3 *Conservation Easements* for details).

Conservation Gap Analysis

A key step in the development of a conservation strategy for a regional HCP or NCCP is to determine the existing level of protection for natural communities and covered species. Species or natural communities with low levels of existing protection may require greater emphasis in the Plan to ensure that their conservation in the study area is assured and the regulatory requirements of the NCCP Act are met. In contrast, species or natural communities that are well

protected may need little or no additional protection by the Plan. For these species, the conservation strategy may instead focus on habitat restoration or improved habitat management. For all species it is expected that enhanced management and monitoring on existing and new protected lands will be needed.

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).

The gap analysis was used as a preliminary step in the conservation planning process to guide the reserve design process. Conservation biology theory holds that by protecting a wide variety of ecosystems and natural communities or land cover types at a broad level (i.e., a coarse-filter and meso-filter approach; see **Figure 5-3**), the majority of the biological diversity contained within these natural communities will also be protected (Noss 1987; Hunter 2005). This approach is then complemented by focusing on finer-level resources such as species occurrences, species habitat, or unique physical features to conserve biological diversity not protected by the broader-level approaches.

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 3 and **Figure 3-10**).
- Species habitat distribution (see Chapter 3 for a general description of these models and **Appendix D** for the model parameters for each species).
- Watersheds (see **Figure 3-6**).

The results of the conservation gap analyses are presented in **Table 5-4** for land cover types and **Table 5-6** for covered species. Data are presented by open space Types 1, 2, 3, and 4 (see Chapter 2 for a definition of open space types). Because of the importance of protecting substantial portions of occupied and suitable habitat for Bay checkerspot butterfly, **Table 5-7** presents the gap analysis for the individual populations recognized in the species account (**Appendix D**). Together, these results constituted a key input to the conservation strategy and the design of the Reserve System.

Gaps in Land Cover and Watershed Protection

Many natural land cover types have greater than 30% of their extent in open space Types 1, 2 or 3 (**Table 5-4**). Natural land cover types that are generally well represented in the study area in open space (>40%) are foothill pine-oak woodland, ponderosa pine woodland, coastal and valley freshwater marsh, willow riparian forest and scrub, ponds, northern mixed chaparral/chamise chaparral, blue oak woodland, and central California sycamore alluvial woodland. Natural land cover types with the lowest proportion in open space overall and where the conservation gaps are most likely to occur are knobcone

pine woodland, coast live oak forest and woodland, serpentine rock outcrop, mixed riparian forest and woodland, and California annual grassland. Agricultural land cover types are poorly represented in open space in the study area.

Of the five major watersheds in the study area (Coyote, Pacheco, Llagas, Guadalupe, and Uvas), Type 1, 2, 3, or 4 open space is greatest in quantity and proportion in the Pacheco and Uvas watersheds (34 and 20%, respectively). The Alameda and Guadalupe watersheds have the least representation in open space Types 1, 2, 3, or 4 (1% each), followed by the Uvas and Llagas watersheds (15% each). In all five watersheds, the majority of land in open space is upstream of reservoirs. There is no Type 1, 2, 3, or 4 open space in the portion of the Santa Cruz Mountains watershed—which includes the headwaters of Pescadero Creek—within the study area (7,209 acres).

Of the 3,035 miles of mapped USGS blue line streams within the study area, approximately 50% are within Type 1, 2, or 3 open space. The Plan will also provide additional protection for ephemeral streams that are not mapped. The level of protection for these streams is generally high with approximately 12% in irrevocable protection and 48% of streams in Types 1, 2, or 3 open space.

Gaps in Species Protection

As shown in **Table 5-6**, most covered species with models have moderate levels of representation in open space Types 1, 2, and 3, between 25% and 50%. Exceptions to this are Bay checkerspot butterfly primary habitat, San Joaquin kit fox movement habitat, San Francisco collinsia primary habitat, western burrowing owl overwintering habitat[6], tricolored blackbird secondary habitat, and least Bell's vireo primary habitat. Potential breeding habitat for least Bell's vireo is particularly underrepresented in Type 1, 2, or 3 open space (12%). No species' habitat, except primary habitat for golden eagle, California red-legged frog refugia habitat, and foothill yellow-legged frog primary habitat, occurs in open space Types 1, 2, and 3 above 50%.

Table 5-7 presents more detail on the status of protection for all Bay checkerspot butterfly populations in the study area, because this species is one of the key species used to design the conservation strategy. As described in the biological goals and objectives for this species (**Table 5-1c**), some populations are targeted for conservation. Of these targeted populations, more than two-thirds are in need of long-term protection, and the level of occurrence in open space by population varies from zero to 100%.

Regional and State Gaps

Gap analyses conducted at scales larger than the study area were also considered to determine whether land cover types in the study area are underrepresented in

[6] Burrowing owl breeding habitat is not listed in **Table 5-6** due to the difficulty in mapping this habitat. The availability of breeding habitat is the primary limiting factor for this species in the study area and almost no protection is in place for this habitat.

Type 1, 2, or 3 open space compared to other regions or to regional conservation targets. For example, the conservation strategy in this Plan will contribute to regional conservation goals for land cover types found throughout the region.

Analysis at the regional scale entailed consulting a gap analysis conducted in the nine-county San Francisco Bay Area (Wild 2002). Although that study was conducted using an older and much coarser dataset[7], it provided a wider regional context and helped to inform conservation priorities for the Habitat Plan. This study utilized a system of open space classification (based on Davis et al. 1998) similar to the one used in this Plan. **Table 5-8** lists the vegetative communities that are found in the study area (equivalent to Habitat Plan land cover types) that were identified as being underrepresented in protected status in the San Francisco Bay Area. Data are also presented in **Table 5-8** on the level of protection of these vegetation communities at the state level (Davis et al. 1998).

Landscape Linkages

Landscape linkages were also used to design the Reserve System. For the purposes of this Plan, landscape linkages are defined as areas that allow for the movement of species from one area of suitable habitat to another. A linkage can vary from a narrow strip of habitat that only functions as a conduit for movement (i.e., a corridor) or a large area of intact habitat that is used for movement, dispersal, and other life functions such as foraging and breeding.

The NCCP Act explicitly requires NCCPs to address landscape or habitat linkages, as shown below.

> Establishing one or more reserves or other measures that provide equivalent conservation of covered species within the plan area and linkages between them and adjacent habitat areas outside of the plan area. (Section 2820[a][4][B].)
>
> Sustaining the effective movement and interchange of organisms between habitat areas in a manner that maintains the ecological integrity of the habitat areas within the plan area. (Section 2820[a][4][E].)

Some species require linkages for periodic migrations among different habitat types used for breeding, feeding, or roosting. Wildlife movement from one important habitat area to another may vary from daily to seasonal migration depending on the species. Linkages may also be needed for the permanent immigration or emigration of individuals among habitat patches, allowing for gene flow and recolonization after local extinction (Beier and Noss 2000; Hilty et al. 2006; Groom et al. 2006).

Linkage requirements differ greatly from species to species. Specific characteristics of linkages, such as dimensions, location, and quality of habitat,

[7] This analysis utilized land cover data from the California Gap Analysis Project (Davis et al. 1998), which used aerial photography from 1990 and minimum mapping units of 247 acres (100 hectares) for upland communities and 98.8 acres (40 hectares) for wetland communities. In addition, the open space data are from 2002.

can influence species use. Wider linkages tend to be more effective than narrower linkages (Merenlender and Crawford 1998; Hilty et al. 2006).

To incorporate landscape linkages in the reserve design process, all known or potential linkages within the study area and in the surrounding areas were compiled from the following sources, in no particular order.

- Statewide assessment of wildlife linkages needs developed by expert opinions of wildlife biologists (California Wilderness Coalition 2002).
- Ecoregional planning process conducted for the central coast region (The Nature Conservancy 2006b).
- A study of movement needs of mountain lions estimated by least-cost path analysis of regional land cover data (Thorne et al. 2002).
- A local workshop on wildlife linkages in the Sierra Azul region[8] held on October 11, 2006 (Coastal Training Program, Elkhorn Slough National Estuarine Research Reserve 2006).
- Wildlife movement data from the study area for American badgers (Diamond 2006; T. Diamond pers. comm.), Tule elk (Coletto 2006; H. Coletto pers. comm.), bobcat, and other species (T. Diamond pers. comm.).
- Locations of existing culverts, bridges, and other overpasses suitable for wildlife along U.S. 101 between Metcalf Road in San José and the Coyote Creek bridge crossing near Morgan Hill (California Department of Fish and Game 2006).
- Locations of median barriers and existing culverts, bridges, and other overpasses suitable for wildlife along SR 152 between the SR 156 interchange and the Santa Clara/Merced County line (data collected by Jones & Stokes in February 2007).
- *Coyote Valley Specific Plan Draft Environmental Impact Report* (City of San José 2007).

Potential dispersal routes for plants and wildlife covered by the Plan were also inferred from the land cover data, compiled occurrence data, and habitat distribution models developed for this Plan (see Chapter 3 and **Appendix D**).

The results of the compilation of these sources are described in **Table 5-9** as 20 distinct and potential landscape linkages found either entirely within the study area or within the study area that lead to outside the study area. **Figure 5-6** illustrates these 20 potential linkages, which are discussed below for their relative importance to the Habitat Plan. These linkages are drawn at a regional level as broad swaths of natural land cover types rather than specific alignments or corridors. Often there are multiple ways to protect land to achieve the linkage design in **Figure 5-6** and the goals in **Table 5-9**.

[8] The Sierra Azul region was defined to encompass the southern portion of the Santa Cruz Mountains south of Highway 17, the Diablo Range, and the Gabilan Range. The workshop focused on issues of connectivity between the Santa Cruz Mountains and the Diablo and Santa Lucia mountain ranges to the east and south.

Regional Connectivity

Maintaining linkages with areas outside the study area (i.e., regional habitat connectivity) is essential to retaining a high level of native biological diversity within the study area. For example, the southeast part of the study area may be an important linkage within the Diablo Range to the north and south (Linkage 15). The San Luis Reservoir in Merced County forms a significant barrier to terrestrial wildlife moving through the eastern Diablo Range, and the study area includes most of the Diablo Range west of the reservoir. Habitat continuity in this area likely benefits species such as San Joaquin kit fox. If kit foxes move from the Salinas Valley to the San Luis Reservoir area in Merced and Stanislaus Counties, they may use the southeastern part of the study area as a secondary route around the San Luis Reservoir.

The Santa Cruz Mountains on the western edge of the study area provide a connection for wide-ranging species between the Santa Cruz Mountains in Santa Cruz and San Mateo Counties and the Gabilan Range to the south. This connection is most apparent at the southern tip of the study area (Linkages 19 and 20) where there is a narrow linkage through the "Chittenden Gap" in Santa Cruz County to the Gabilan Range and the Santa Lucia Range to the south. If linkages like this are severed, populations of wide-ranging species (e.g., mountain lion) could be extirpated from the Santa Cruz Mountains because that range is likely insufficient in size to sustain a viable mountain lion population on its own (Thorne et al. 2002; Coastal Training Program 2006).

Connectivity within the Study Area

Within the study area, many landscape linkages are important to maintain connections among populations. For example, the major stream corridors of Coyote Creek, Guadalupe River, Pacheco Creek, Uvas Creek, Llagas Creek, Pajaro River (Linkages 1, 2, 11, 12, 17, 18), and Pescadero Creek all support native fish species. These corridors also provide critical connections for other aquatic and terrestrial species moving through urban or cultivated agricultural areas.

There is considerable existing open space in the Santa Cruz Mountains both inside and outside the study area (**Figure 2-3**). Additional linkages could be made between existing open space within the study area (Linkages 9 and 13). Such connectivity would benefit covered species such as California tiger salamander, California red-legged frog, and foothill yellow-legged frog, and other native species such as Coast Range newt, bobcat, and mountain lion.

Protected areas adjacent to Henry W. Coe State Park form a large nucleus of open space within the study area. These protected areas already provide landscape linkages for species such as California red-legged frog, California tiger salamander, Tule elk, American badger, bobcat, mountain lion, and mule deer. Additional landscape linkages would connect this large core open space with smaller protected areas and with key features outside the study area (e.g., Linkages 5, 6, 7, 14, 15, and 16).

Linking the Santa Cruz Mountains and the Diablo Range

Historically, the Santa Cruz Mountains and the Diablo Range were linked across the Santa Clara Valley through a network of creeks, wetland complexes, and large stands of valley oak woodland (San Francisco Estuary Institute 2006). Over time this linkage has diminished with urban development, road barriers, and cultivated agriculture. Because some of the valley floor has remained in agricultural production and the creek corridors are largely intact, some connectivity remains (Linkages 8 and 10). There has been considerable debate recently about the best means to maintain this important connectivity between the Santa Cruz Mountains and the Diablo Range within the study area (Coastal Training Program 2006; City of San José 2007).

The connectivity between the Santa Cruz Mountains and the Diablo Range is expected to degrade further as covered activities are implemented. For example, development within Morgan Hill and Gilroy will make it more difficult for some wildlife species to cross the valley floor. The eventual development of the Coyote Valley Urban Reserve at the southern end of San José is expected to contribute to this long-term degradation (see Chapter 4). An important conservation objective of this Plan is to preserve and enhance the linkage between the two ranges (see Goal 2 in **Table 5-1a**). See landscape-level conservation actions in Section 5.3.2 *Landscape Conservation and Management* for more details.

The Use of Maps to Define the Reserve System

Regional conservation plans take a variety of approaches in the use of maps to display land acquisition requirements. At one end of the spectrum, a conservation plan may use maps to delineate exactly where reserves are to be created. In this type of plan, often called a *map-based plan*, map designations define the application of regulations, fees, land acquisition, restoration, or other elements of the plan. Because all landowners must agree to the designation placed on their lands, purely map-based plans (otherwise known as *hard boundary* or *hard line* plans) are difficult to develop on a large scale and are rare.

At the other end of the spectrum, a conservation plan may display no maps or only very general maps and instead include a *process-based* land acquisition strategy. A purely process-based plan (also known as a *policy-based* or *criteria-based* plan) has no maps of where reserves will be established or other mitigation accomplished. Instead, the conservation plan outlines a detailed process by which reserves are assembled according to a set of clear criteria. The amount of flexibility in a process-based plan depends on the flexibility of the reserve assembly criteria.

The Local Partners considered the full range of available approaches and chose to employ a combination of these strategies. This Plan uses a hybrid approach in which maps display conservation priorities on a regional scale. Land acquisition will be undertaken in accordance with a detailed set of requirements, while

maintaining flexibility in how the Reserve System is ultimately assembled. Although the final boundaries of the system cannot be known, the general location, size, configuration, and protected resources of the reserves are described in the conservation actions below. The Local Partners considered this element of the plan to be essential to its success.

Geographic Units of Conservation

The study area was subdivided into 34 discrete units called *conservation analysis zones* (**Figure 5-5**) to identify locations for conservation actions consistent with the hybrid approach to the use of maps described above. These zones define the areas in which conservation actions could occur outside existing protected areas. The primary purpose of these zones 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 to meet the same conservation objectives (i.e., to respond to willing sellers where they arise). 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 analysis zones were developed using subwatershed boundaries from the California Department of Water Resources (Calwater221) that were aligned with the watershed boundaries used by the Habitat Plan. Existing open space (Types 1–3) was excluded from the zones. Subwatersheds smaller than 3,000 acres were merged with their adjacent larger subwatershed within the same watershed. Other adjustments were made to the zone boundaries to facilitate the conservation strategy; for example, the large Santa Clara Valley subwatershed that includes lower Llagas Creek was split into two subwatersheds for planning purposes[9]. Subwatersheds with mostly urbanized areas were also merged for convenience.

Conservation analysis zones were defined within the six primary watersheds of the study area: Guadalupe, Coyote, Llagas, Uvas, Pacheco, and Pescadero (**Figure 5-5**). The portions of the study area within the Calabazas and San Tomas watersheds were combined into a single conservation analysis zone. Conservation analysis zones were numbered sequentially within each watershed generally from headwaters to their exit from the study area. The size and land cover types found in each conservation analysis watershed is shown in **Table 5-10**.

[9] In addition, the subwatershed surrounding Anderson Reservoir was merged with the adjacent three subwatersheds to create a less fragmented conservation planning unit.

Reserve Assembly Process

The Implementing Entity will establish the Reserve System through acquisition of land in fee title, conservation easement, or purchase of credits at an approved mitigation bank. Lands will only be acquired from willing sellers or donors that meet one or more of the biological goals and objectives and the land acquisition requirements described below. The Implementing Entity will assemble the Reserve System in any of seven ways.

- Enhancement of land owned by a Permittee and inclusion by conservation easement.
- Purchase of land in fee title from willing sellers.
- Purchase of conservation easements from willing sellers.
- Purchase of land or conservation easements in partnership with other organization(s) (not to be used as mitigation for another project that is not a covered activity).
- Acceptance of land or easement dedication in lieu of fee payment if the easement contributes to the goals and objectives of the Habitat Plan and is approved by the Implementing Entity and the Wildlife Agencies.
- Acceptance of credits sold in private mitigation banks approved by USFWS and CDFG if they meet the terms of the Plan (see Chapter 8, Section 8.6.2 *Land Acquired by Other Organizations or through Partnerships*).
- Acceptance of land or easement dedication as a gift or charitable donation.

Acquisition of land in fee title will likely be the primary mechanism used in most conservation analysis zones. A combination of acquisition in fee title and conservation easements is expected to be used in Llagas-3 and Llagas-4 due to the prevalence of intensive cultivated agriculture.

The terms of each conservation easement may be tailored to each landowner, parcel, and agricultural operation, but will be consistent with goals of the conservation strategy, the general principles for easements outlined in this Plan (see Chapter 8), and the guidelines in the Implementing Agreement. Conservation easements on cultivated lands will help to meet the biological goals and objectives of the Habitat Plan while maintaining economically viable agricultural operations.

The land and conservation easement acquisition process and the conditions under which the other four reserve assembly techniques may be used are discussed in detail in Chapter 8.

To achieve the Plan's biological goals and objectives, including contribution to the recovery of covered species, it is important to focus land acquisition where it will have the greatest conservation benefit. By concentrating land acquisition in certain areas, larger effective reserves can be assembled by augmenting and connecting existing protected lands. However, the Implementing Entity must have flexibility in deciding where to acquire land because the Plan depends on

the availability of willing sellers. The Plan balances these needs by focusing acquisition of certain land cover types within certain conservation analysis zones, as described below.

Despite this flexibility, the Implementing Entity will prioritize land acquisition in order to buy parcels of greatest conservation value (e.g., see *Reserve Design and Assembly Principles*, above) under the greatest threat of development and whose cost is expected to rise fastest. These criteria are met in conservation areas that span the floor of the Santa Clara Valley (Coyote-7, Llagas-3, Llagas-4) and the foothills immediately adjacent to the valley floor (Guadalupe 1, 3; Coyote-7, 8; Llagas-2, 3, 4; Uvas-1, 2, 5, 6; Pescadero-1).

When possible, land will first be acquired adjacent to existing protected areas to ensure that, in the unlikely event that public funding does not become available (see Chapter 9 for details), the Reserve System is composed of contiguous units rather than isolated parcels.

Field Verification Prior to Acquisition

Land cover data, species occurrence data, and species habitat distribution models were developed for this Plan at a regional scale. The data and models were used to develop a sound conservation strategy for the study area at this regional scale. These data and models are not intended for site-specific planning because of the limitations described in Chapter 3.

To account for some of the uncertainty inherent in this conservation strategy, biological resources in potential conservation areas will, whenever possible, be verified in the field prior to land acquisition. The Implementing Entity will conduct *pre-acquisition assessments* on potential reserve lands to evaluate whether these lands are likely to meet Plan requirements. If a pre-acquisition assessment is not feasible, the Implementing Entity will conduct an assessment of the site based on air photo analysis and the best available regional data sets (e.g., Habitat Plan data, CNDDB).

The biological suitability of the site for the Reserve System will be determined on the basis of the information listed below.

- The results of past biological surveys, updated land cover mapping, assessments of habitat suitability for covered species, air photo interpretation, and the biological resources present or expected on site.
- An evaluation of the site's enhancement and restoration potential.
- An evaluation of how well the site achieves the reserve design principles listed above.
- An evaluation of the site's existing and potential biological value in the context of the remaining unmet biological goals and objectives and land acquisition requirements.

Types of information collected during these assessments will include an evaluation of location, quantity, quality, and type of covered species populations; covered species habitat; and natural communities present, as well as other site conditions or infrastructure that would benefit or conflict with the Plan's biological goals and objectives. The site's restoration and enhancement potential will also be evaluated. This information will help the Implementing Entity prioritize acquisition of reserve lands based on their relative contribution toward meeting the biological goals and objectives. More details on pre-acquisition assessments are found in Chapter 8.

5.2.4 Aquatic Habitat Protection and Enhancement

Protection and enhancement of aquatic habitat for covered species and other native species is an important goal of this Plan. Protection of off-stream aquatic habitats will be accomplished through the land acquisition process described below and through the stream and riparian setback requirement described in Chapter 6 (see Condition 11 *Stream and Riparian Setbacks*). In addition, the Plan requires restoration of aquatic land cover types to ensure no net loss in their extent and function within the study area.

The approach to stream and riparian woodland land cover protection and enhancement combines elements of land acquisition, restoration, and water management. The land acquisition strategy focuses on stream protection primarily in areas where large stands of riparian woodland are present, such as along the Pajaro River, Pacheco Creek, San Felipe Creek, and upper Uvas Creek. This focus has the dual benefit of protecting streams and riparian woodland habitats. Stream protection through land acquisition will also occur in areas most suitable for riparian woodland restoration to support covered birds, amphibians, reptiles, and native fish species.

Stream and riparian protection will also occur through the development review process when projects are proposed adjacent to streams. Through the stream and riparian setbacks condition (Condition 11 in Chapter 6), applicants will be required to set aside stream frontage to protect stream and riparian functions. In some cases, high-value stream setback areas will be incorporated into the Reserve System to increase opportunities for riparian and stream restoration, and provide greater consistency in management and monitoring of these areas.

To enhance habitat for native fish species and covered amphibian and riparian bird species, broader strategies are needed than riparian woodland restoration in specific locations. To contribute to the recovery of covered amphibians and reptiles, the Plan will acquire and enhance upper watershed streams and associated upland riparian habitat throughout the study area. To enhance habitat for least Bell's vireo and other native songbirds, the Plan will provide riparian restoration opportunities along Llagas Creek, Pacheco Creek, Uvas Creek, and the Pajaro River.

Table 5-1a. Biological Goals, Objectives and Conservation Actions: Landscape Level

Biological Goals and Objectives	Conservation Actions[1,2]	Monitoring Action
Goal 1a. Protect and maintain natural and semi-natural landscapes.[1]		
Objective 1a.1. Establish a reserve system of at least 55,695 acres and 100 stream miles within the study area (see Figure 5-05 for acquisition target areas by Conservation Analysis Zones).[2]	LAND-L1. Acquire in fee title or obtain easements on 100 stream miles within the study area.	Compliance monitoring and annual reports
	LAND-L2a. Acquire in fee title or obtain easements on at least 42,695 acres of land for the Reserve System.	Compliance monitoring and annual reports
	LAND-L2b. Incorporate at least 13,000 acres of existing open space[3] into the Reserve System.	Compliance monitoring and annual reports
Objective 1a.2. Protect streams (100 miles), ponds (50 acres) freshwater wetlands (10 acres), and seasonal wetlands (5 acres) within the Reserve System.	LAND-L3. Acquire in fee title or obtain easements on streams (100 miles), ponds (50 acres), freshwater wetlands (10 acres), and seasonal wetlands (5 acres) in all watersheds of the study area.	Compliance monitoring and annual reports
Goal 1b. Protect and maintain ecological (natural) processes.		
Objective 1b.1. Protect a range of environmental gradients (such as slope, elevation, aspect, rainfall) across a diversity of natural communities within the Reserve System.[2]	LAND-L2c. Acquire in fee title or obtain easements on 42,695 acres of land for the Reserve System that includes the full range of topographic and geographic diversity in the study area.	Compliance monitoring and annual reports
	LAND-L2d. Incorporate at least 13,000 acres of existing open space[3] into the Reserve System that includes the full range of topographic and geographic diversity in the study area.	Compliance monitoring and annual reports
Goal 2. Maintain or improve opportunities for movement and genetic exchange of native organisms within and between natural communities inside and connecting to areas outside of the study area[4].		
Objective 2.1. Determine wildlife movement across Coyote Creek downstream of Anderson Reservoir, Pacheco Creek (SR 152), and the Pajaro River when adequate monitoring data exist on wildlife movement in the three focal areas or by year 10 of implementation, whichever comes first.	STUDIES-1. Conduct feasibility study to determine wildlife movement across Coyote Creek downstream of Anderson Reservoir, Pacheco Creek (SR 152), and the Pajaro River.	Analyze and quantify movement of indicator species to determine whether linkages are functioning as intended.
Objective 2.2. Protect and enhance important habitat linkages for covered species and other native species within the Reserve System and protect connectivity to habitat outside the study area (Figure 5-6 and Table 5-9).[2]	LAND-L4. Acquire and enhance natural and semi-natural landscapes between the Santa Teresa Hills and Metcalf Canyon to the south that will contribute to providing connectivity between the Santa Cruz Mountains and the Diablo Range to promote the movement of covered and other native species at many spatial scales (Linkage 10 in Table 5-9 and Figure 5-6).	Compliance monitoring for land acquisition. Analyze and quantify movement of indicator species to determine whether linkages are functioning as intended.
	LAND-L5. Acquire in fee title or obtain easements on 3,400 acres of serpentine grassland along Coyote Ridge to link existing protected areas and to create a large core reserve for serpentine grassland species to move within (Linkage 6 in Table 5-9 and Figure 5-6). These acreages are inclusive of, not in addition to, acquisition targets set in LAND-G3.	Compliance monitoring for land acquisition. Analyze and quantify movement of indicator species to determine whether linkages are functioning as intended.
	LAND-L6. Acquire in fee title or obtain easements on at least 3,000 acres of grassland, chaparral & coastal scrub, and oak woodland natural communities south of Henry W. Coe State Park to link this core reserve with extensive wetlands surrounding San Felipe Lake in San Benito County (Linkage 14 in Table 5-9 and Figure 5-6).	Compliance monitoring for land acquisition. Analyze and quantify movement of indicator species to determine whether linkages are functioning as intended.

Biological Goals and Objectives	Conservation Actions[1,2]	Monitoring Action
	LAND- L7. Acquire in fee title or obtain easements on at least 2,300 acres of grassland, chaparral & coastal scrub, and oak woodland natural communities in the NE corner of the study area to link the core reserve that includes Joseph Grant County Park with SFPUC lands and other protected lands in Alameda County (Linkage 4 in Table 5-9 and Figure 5 6).	Compliance monitoring for land acquisition. Analyze and quantify movement of indicator species to determine whether linkages are functioning as intended.
	LAND-L8. Acquire in fee title or obtain easements on at least 650 acres of grassland, chaparral & coastal scrub, and oak woodland natural communities to connect Almaden Quicksilver County Park with protected open space to the east near Calero Lake (Linkage 9 in Table 5-9 and Figure 5-6).	Compliance monitoring for land acquisition. Analyze and quantify movement of indicator species to determine whether linkages are functioning as intended.
	LAND-L9. Acquire in fee title or obtain easements on 2,000 acres of conifer woodland, riparian forest & scrub, oak woodland, and grassland natural communities, in the portion of the Pescadero Watershed that is in the study area and along the Pajaro River, to maintain wildlife connections between the Santa Cruz Mountains and the Gabilan Range outside the study area (Linkages 18, 19, and 20 in Table 5-9 and Figure 5-6).	Compliance monitoring for land acquisition. Analyze and quantify movement of indicator species to determine whether linkages are functioning as intended.
	LAND-L10. Acquire in fee title or obtain easements on serpentine grassland along Coyote Ridge to protect the connection between Silver Creek and Kirby Canyon (Linkage 6 in Table 5-9 and Figure 5-6) as part of the acquisition targets set in LAND-G3.	Compliance monitoring for land acquisition. Analyze and quantify movement of indicator species to determine whether linkages are functioning as intended.
Objective 2.3. Increase the permeability of Highway 152 for species movement across Pacheco Creek and Highway 152 from the Highway 152/156 interchange east to the Santa Clara/Merced county line at locations determined by the feasibility study and with structures that have the potential to most benefit movement of a variety of native species by year 20 (Linkage 15 in Figure 5-6 and Table 5-9).[6,7]	LM-1. Remove fences and roads in areas where they are no longer needed and where their removal could increase the permeability of the study area for wildlife.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-2. When replacing small culverts ensure that the culvert has a natural bottom and is large enough for larger mammals such as deer and mountain lions to pass, if feasible. Culverts must provide direct movement from one side of the road to the other and ensure that the culvert is visible to the target species (i.e., do not obscure entrance with vegetation). Install fencing or other features that will direct wildlife towards the culvert or other safe crossing within the first 20 years of implementation.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-3. Where structurally possible, replace culverts with free span bridges to ensure free movement for wildlife under roadways.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-4. Ensure that median barrier removal and/or median perforations are considered as alternatives during project design.	Compliance monitoring for infrastructure/structure removal, replacement, or installation.

Biological Goals and Objectives	Conservation Actions[1,2]	Monitoring Action
	LM-5. Remove median barriers or perforate sections of median barriers along roadways to improve successful wildlife crossings and install fencing or other features to direct wildlife to those open sections within first 20 years of implementation. Use feasibility study to determine location and length of barrier removal.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
Objective 2.4. Increase the permeability for species movement across Santa Clara Valley between the Diablo Range and the Santa Cruz Mountains and between Coyote Ridge and Diable Range to the Santa Cruz Mountains via Coyote Valley, Tulare Hill, or Fisher Creek at locations determined by the feasibility study and with structures that have the potential to most benefit movement of a variety of covered and other native species by year 20 (Linkages 8 and 10 in Figure 5-6 and Table 5-9).[6]	LM-1. Remove fences and roads in areas where they are no longer needed and where their removal could increase the permeability of the study area for wildlife.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-2. When replacing small culverts ensure that the culvert has a natural bottom and is large enough for larger mammals such as deer and mountain lions to pass, if feasible. Culverts must provide direct movement from one side of the road to the other and ensure that the culvert is visible to the target species (i.e., do not obscure entrance with vegetation). Install fencing or other features that will direct wildlife towards the culvert or other safe crossing within the first 20 years of implementation.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-3. Where structurally possible, replace culverts with free span bridges to ensure free movement for wildlife under roadways.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-4. Ensure that median barrier removal and/or median perforations are considered as alternatives during project design.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-5. Remove median barriers or perforate sections of median barriers along roadways to improve successful wildlife crossings and install fencing or other features to direct wildlife to those open sections within first 20 years of implementation. Use feasibility study to determine location and length of barrier removal.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.

Biological Goals and Objectives	Conservation Actions[1,2]	Monitoring Action
Objective 2.5. Increase the permeability for species movement across the Santa Clara Valley from Llagas Creek headwaters to the confluence with the Pajaro River at locations determined by the feasibility study and with structures that have the potential to most benefit movement of a variety of covered and other native species by year 20 (Linkage 11 in Figure 5-6 and Table 5-9).[6]	LM-1. Remove fences and roads in areas where they are no longer needed and where their removal could increase the permeability of the study area for wildlife.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-2. When replacing small culverts ensure that the culvert has a natural bottom and is large enough for larger mammals such as deer and mountain lions to pass, if feasible. Culverts must provide direct movement from one side of the road to the other and ensure that the culvert is visible to the target species (i.e., do not obscure entrance with vegetation). Install fencing or other features that will direct wildlife towards the culvert or other safe crossing within the first 20 years of implementation.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-3. Where structurally possible, replace culverts with free span bridges to ensure free movement for wildlife under roadways.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-4. Ensure that median barrier removal and/or median perforations are considered as alternatives during project design.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-5. Remove median barriers or perforate sections of median barriers along roadways to improve successful wildlife crossings and install fencing or other features to direct wildlife to those open sections within first 20 years of implementation. Use feasibility study to determine location and length of barrier removal.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
Objective 2.6. Increase the permeability for species movement across Santa Clara Valley from the Santa Cruz Mountains to Diablo Range along the Pajaro River at locations determined by feasibility study and with structures that have the potential to most benefit movement of a variety of covered and other native species by year 20 (Linkage 18 in Figure 5-6 and Table 5-9).[6]	LM-1. Remove fences and roads in areas where they are no longer needed and where their removal could increase the permeability of the study area for wildlife.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-2. When replacing small culverts ensure that the culvert has a natural bottom and is large enough for larger mammals such as deer and mountain lions to pass, if feasible. Culverts must provide direct movement from one side of the road to the other and ensure that the culvert is visible to the target species (i.e., do not obscure entrance with vegetation). Install fencing or other features that will direct wildlife towards the culvert or other safe crossing within the first 20 years of implementation.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.

Biological Goals and Objectives	Conservation Actions[1,2]	Monitoring Action
	LM-3. Where structurally possible, replace culverts with free span bridges to ensure free movement for wildlife under roadways.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-4. Ensure that median barrier removal and/or median perforations are considered as alternatives during project design.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-5. Remove median barriers or perforate sections of median barriers along roadways to improve successful wildlife crossings and install fencing or other features to direct wildlife to those open sections within first 20 years of implementation. Use feasibility study to determine location and length of barrier removal.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
Objective 2.7. Increase the permeability for species movement across Highway 152 from Uvas Creek headwaters to the confluence with the Pajaro River, and from Uvas Canyon County Park to Pajaro River through the Santa Cruz Mountains at locations determined by the feasibility study and with structures that have the potential to most benefit movement of a variety of covered and other native species by year 20 (Linkages 12 and 13 in Figure 5-6 and Table 5-9).[6]	LM-1. Remove fences and roads in areas where they are no longer needed and where their removal could increase the permeability of the study area for wildlife.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-2. When replacing small culverts ensure that the culvert has a natural bottom and is large enough for larger mammals such as deer and mountain lions to pass, if feasible. Culverts must provide direct movement from one side of the road to the other and ensure that the culvert is visible to the target species (i.e., do not obscure entrance with vegetation). Install fencing or other features that will direct wildlife towards the culvert or other safe crossing within the first 20 years of implementation.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-3. Where structurally possible, replace culverts with free span bridges to ensure free movement for wildlife under roadways.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-4. Ensure that median barrier removal and/or median perforations are considered as alternatives during project design.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.

Biological Goals and Objectives	Conservation Actions[1,2]	Monitoring Action
	LM-5. Remove median barriers or perforate sections of median barriers along roadways to improve successful wildlife crossings and install fencing or other features to direct wildlife to those open sections within first 20 years of implementation. Use feasibility study to determine location and length of barrier removal.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
Goal 3. Enhance or restore representative natural and semi-natural landscapes to maintain or increase native biological diversity.		
Objective 3.1. To increase the total area of quality habitat for covered and other native species and to improve hydrologic function, enhance 42,695 acres of terrestrial and acquatic land cover types and 100 miles of streams, and restore 1 mile of stream and restore or create 90 acres of aquatic land cover types within the Reserve System. If all predicted impacts occur, restore 12.6 miles of streams and restore or create 566 acres of acquatic land cover types within the Reserve System.[3]	LM-6. Enhance or restore an estimated 20,240 acres of grassland, 3,500 acres of chaparral and northern coastal scrub, 17,100 acres of oak woodland, 290 acres of riparian forest and scrub, and 500 acres of conifer woodland within the Reserve System.	Compliance monitoring with additional monitoring for effectiveness of restoration/enhancement/creation developed at natural community level.
	LM-7a. Restore a minimum of 1.0 miles of stream, 50 acres of riparian forest and scrub, and 20 acres of freshwater marsh, and create 20 acres of ponds to contribute to species recovery.	Compliance monitoring. Monitor baseline hydrologic function against future changes.
	LM-7b. If all predicted impacts occur, restore 12.6 miles of streams, 399 acres of riparian forest and scrub, 45 acres of freshwater marsh, and 30 acres of seasonal wetlands, and create 92 acres of ponds within all watersheds of the study area to maintain and when necessary improve stream hydrologic functions.	Compliance monitoring. Monitor baseline hydrologic function against future changes.
Objective 3.2a. Ensure natural fire disturbance regimes required for natural community regeneration and structural diversity, and covered species germination and recruitment occur within the Reserve System or implement management actions that mimic those natural disturbances through development of a fire management component of each reserve unit management plan.[3,8]	LM-8. Negotiate with Cal Fire and other local fire-fighting agencies the use of management response measures for all fire events and fire-dependent ecosystems that minimize impacts to natural communities and covered species while protecting human life and property. All burns will be responded to, and prescribed burns will be conducted, with minimum impact suppression tactics. Burn response will take into consideration ignition location and method, seasonality, weather and availability of suppression forces.	Compliance monitoring including effects of burning monitored as part of natural community enhancement. For management actions that mimic natural fire regimes, compare post-fire vegetation to baseline conditions at periodic intervals to assess the effect of various fire frequencies and intensities at promoting native plants and reducing non-native plants. Monitor target covered species response.
	LM-9. In identified "no burn" areas implement the biologically appropriate management actions that mimic the natural effects of fire (e.g., mowing, grazing, hand pulling) to subsequently improve habitat for native vegetation.	Analyze and quantify effectiveness of burning vs. other management actions in increasing diversity and quantity of native vegetation. Monitor target covered species response, if applicable.
Objective 3.2b. Ensure natural flooding disturbance regimes required for natural community regeneration and structural diversity, and covered species germination and recruitment occur within the Reserve System or implement management actions that mimic those natural disturbances through adoption of the SCVWD Natural Flood Protection Plan (2000).[3]	LM-10. Integrate adopted policies for natural flood protection (i.e.,Ordinance O6-1, *Clean, Safe Creeks and Natural Flood Protection Plan* , *Coyote Watershed Stream Stewardship Plan*) into flood protection projects to protect habitat for covered fish, amphibians, and reptiles.	Compliance monitoring

Biological Goals and Objectives	Conservation Actions[1,2]	Monitoring Action
Objective 3.3. Eradicate or reduce the cover, biomass, and distribution of existing target, non-native invasive plants and reduce the number and distribution of non-native, invasive animals to enhance natural communities and covered species habitat within the Reserve System.[3]	LM-11. Graze, mow, hand-pull, to reduce non-native invasive plant species, both terrestrial and aquatic, to a level where native plants can reestablish and remain dominant within the Reserve System.	Monitor status of non-native invasive plants in target iradication areas and assess efficacy of various techniques. Monitor covered species response.
	LM-12. Eradicate or reduce nonnative pig disturbance within the Reserve System through trapping, hunting, or other control methods. Success criteria is achieved through ensuring disturbances by nonnative pigs do not impair the ability of the Reserve System from meeting the biological goals and objectives.	Analyze and quantify numbers of pigs irradicated and evidence of remaining population (e.g., pig observations or signs of damage).
	LM-13. Eradicate or reduce nonnative predators (bullfrogs, invasive fish, feral cats) within the Reserve System through habitat manipulation (e.g., periodic draining of ponds), trapping, hand capturing, electroshocking or other control methods to achieve targets identified in reserve unit management plans.	Monitor response of nonnative predators to habitat manipulation and assess efficacy of various techniques.
	LM-14. Selectively apply herbicides or other treatments to invasive plants.	Monitor status of non-native invasive plants in target iradication areas and assess efficacy of various techniques. Monitor covered species response.
	STUDIES-2. Experimentally manage oak woodlands to reduce seedling mortality, increase seedling and sapling survival and determine factors relevant to regeneration, including browsing by mammals, birds, and insects.	Monitor research results.

Notes:

[1] Habitat enhancement, monitoring, and adaptive management program, will continue in perpetuity. Restoration and creation must occur in rough step with impacts as required by the Stay-Ahead provision (see Chapter 8, Section 8.6.1). All habitat restoration will be completed by Year 40.

[2] Land acquisition must occur in rough step with impacts as required by the Stay-Ahead provision (see Chapter 8, Section 8.6.1). All land acquisition must be complete by Year 45. Land acquisition requiring restoration or creation of habitat for Covered Species must be complete by Year 40. Reference Table 5-29 for interim land acquisition timelines.

[3] See Tables 5-4 and Figure 5-4

[4] Excerpted from NCCP Act and revised for the Plan.

[5] The Plan will protect riverine systems and hydrologic function, both inside and outside the Reserve System, by acquiring habitat in upper watersheds and other important stream segments and by regulating flow on five major fish-bearing creeks and rivers.

[6] Specific locations and structures will be identified as part of a feasibility study.

[7] Design will be based on the best available science and be consistent with Condition 6 in Chapter 6, Design and Construction Requirements for Covered Transportation Projects

[8] Fire management will be incorporated into the reserve unit management plans within 5 years of the first acquisition of the land for the reserve unit.

Table 5-1b. Biological Goals, Objectives, and Conservation Actions: Natural Community Level

Biological Goals and Objectives	Conservation Actions	Monitoring Action
Grassland		
Goal 4. Maintain and enhance grassland communities that benefit covered species and promote native biodiversity.		
Objective 4.1. Protect 4,730 acres of serpentine grassland containing the full range of serpentine grassland associations and species including serpentine seeps and serpentine rock outcrops as part of the Reserve System within the study area.[2]	LAND-G1. Acquire 4,730 acres of serpentine grassland by fee title or conservation easement with the full range of serpentine grassland associations and vegetation diversity found throughout the study area. This includes 4,600 acres of sepentine bunchgrass grassland, 120 of serpentine rock outcrops/barrens, and 10 acres of serpentine seeps.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
Objective 4.2. Protect 15,500 acres of annual grassland in a diversity of soils types and other environmental gradients including areas suitable for enhancing native species, provide a matrix of pond, wetland, and upland haibtat, and those containing native grassland as part of the Reserve System within the study area.[2]	LAND-G2. Acquire 15,500 acres of annual grassland by fee title or conservation easement as part of the Reserve System. Target areas on both sides of Santa Clara Valley with a high concentration of ponds occupied by covered species or native species and/or other ponds capable of being restored. Acquisition of native grassland will be given priority.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
Objective 4.3a. Reduce cover and biomass of non-native plants.[3]	GRASS-1. Continue or introduce livestock and native herbivore (e.g., elk) grazing in a variety of grazing regimes.	Monitor effects of various grazing regimes on reducing nonnative plants and increasing diversity and biomass of native plants. In oak woodlands, monitor effects of various grazing regimes on oak woodland regeneration and recruitment. Monitor target covered species responses.
	GRASS-2. Conduct prescribed burns. Use targeted studies to inform methods, timing, location, and frequency.	Monitor effects of burning on reducing nonnative plants and increasing diversity and biomass of native plants. Monitor target covered species responses.
	GRASS-3. Conduct mowing in selected areas to mimic grazing where use of livestock is impractical.	Monitor effects of mowing on reducing nonnative plants and increasing diversity and biomass of native plants. Monitor target covered species response.
	GRASS-4. Conduct selected seeding of native forbs and grasses in the Reserve System.	Monitor success of seeding efforts in promoting native forbs and grasses. Monitor target covered species responses.
	LM-8. Negotiate with Cal Fire and other local fire-fighting agencies the use of management response measures for all fire events and fire-dependent ecosystems that minimize impacts to natural communities and covered species while protecting human life and property. All burns will be responded to, and prescribed burns will be conducted, with minimum impact suppression tactics. Burn response will take into consideration ignition location and method, seasonality, weather and availability of suppression forces.	Compare post-fire vegetation to baseline conditions at periodic intervals to assess the effect of various fire frequencies and intensities at promoting native plants and reducing non-native plants. Monitor target covered species response.
	LM-9. In identified “no burn” areas implement the biologically appropriate management actions that mimic the natural effects of fire (e.g., mowing, grazing, hand pulling) to subsequently improve habitat for native vegetation.	Analyze and quantify effectiveness of burning vs. other management actions in increasing diversity and quantity of native vegetation. Monitor target covered species response, if applicable.
	LM-11. Graze, mow, hand-pull, to reduce non-native invasive plant species, both terrestrial and aquatic, to a level where native plants can reestablish and remain dominant within the Reserve System.	Monitor status of non-native invasive plants in target iradication areas and assess efficacy of various techniques. Monitor covered species response.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	LM-14. Selectively apply herbicides or other treatments to invasive plants.	Monitor status of non-native invasive plants in target iradication areas and assess efficacy of various techniques. Monitor covered species response.
Objective 4.3b. Decrease nitrogen deposition in serpentine grasslands to reduce non-native, invasive plant growth.	GRASS-1. Continue or introduce livestock and native herbivore (e.g., elk) grazing in a variety of grazing regimes.	Monitor effects of various grazing regimes on reducing nonnative plants and increasing diversity and biomass of native plants. In oak woodlands, monitor effects of various grazing regimes on oak woodland regeneration and recruitment. Monitor target covered species responses.
	GRASS-2. Conduct prescribed burns. Use targeted studies to inform methods, timing, location, and frequency.	Monitor effects of burning on reducing nonnative plants and increasing diversity and biomass of native plants. Monitor target covered species responses.
	GRASS-3. Conduct mowing in selected areas to mimic grazing where use of livestock is impractical.	Monitor effects of mowing on reducing nonnative plants and increasing diversity and biomass of native plants. Monitor target covered species response.
	GRASS-4. Conduct selected seeding of native forbs and grasses in the Reserve System.	Monitor success of seeding efforts in promoting native forbs and grasses. Monitor target covered species responses.
	LM-8. Negotiate with Cal Fire and other local fire-fighting agencies the use of management response measures for all fire events and fire-dependent ecosystems that minimize impacts to natural communities and covered species while protecting human life and property. All burns will be responded to, and prescribed burns will be conducted, with minimum impact suppression tactics. Burn response will take into consideration ignition location and method, seasonality, weather and availability of suppression forces.	Compare post-fire vegetation to baseline conditions at periodic intervals to assess the effect of various fire frequencies and intensities at promoting native plants and reducing non-native plants. Monitor target covered species response.
Objective 4.3c. Increase the diversity of native plants within the Reserve System.[3]	GRASS-1. Continue or introduce livestock and native herbivore (e.g., elk) grazing in a variety of grazing regimes.	Monitor effects of various grazing regimes on reducing nonnative plants and increasing diversity and biomass of native plants. In oak woodlands, monitor effects of various grazing regimes on oak woodland regeneration and recruitment. Monitor target covered species responses.
	GRASS-2. Conduct prescribed burns. Use targeted studies to inform methods, timing, location, and frequency.	Monitor effects of burning on reducing nonnative plants and increasing diversity and biomass of native plants. Monitor target covered species responses.
	GRASS-3. Conduct mowing in selected areas to mimic grazing where use of livestock is impractical.	Monitor effects of mowing on reducing nonnative plants and increasing diversity and biomass of native plants. Monitor target covered species response.
	GRASS-4. Conduct selected seeding of native forbs and grasses in the Reserve System.	Monitor success of seeding efforts in promoting native forbs and grasses. Monitor target covered species responses.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	LM-8. Negotiate with Cal Fire and other local fire-fighting agencies the use of management response measures for all fire events and fire-dependent ecosystems that minimize impacts to natural communities and covered species while protecting human life and property. All burns will be responded to, and prescribed burns will be conducted, with minimum impact suppression tactics. Burn response will take into consideration ignition location and method, seasonality, weather and availability of suppression forces.	Compare post-fire vegetation to baseline conditions at periodic intervals to assess the effect of various fire frequencies and intensities at promoting native plants. Monitor target covered species response.
	LM-9. In identified "no burn" areas implement the biologically appropriate management actions that mimic the natural effects of fire (e.g., mowing, grazing, hand pulling) to subsequently improve habitat for native vegetation.	Analyze and quantify effectiveness of burning vs. other management actions in increasing diversity and quantity of native vegetation. Monitor target covered species response, if applicable.
Objective 4.4. Increase the distribution and availability of California ground squirrels to increase the prey base for San Joaquin kit fox and golden eagle and to increase burrow availability within grassland for California tiger salamander, California red-legged frog, western burrowing owl, San Joaquin kit fox, and other native species within the Reserve System.[3]	GRASS-5. Prohibit use of rodenticides within the Reserve System and, when possible, outside of the Reserve System, except when needed to protect the integrity of structures, such as levees, stock ponds and dams, or to prevent nuisance populations on adjacent private lands.[1]	Monitor population trend of California ground squirrels. Track changes in burrowing mammal colony size over time.
	GRASS-6. Introduce livestock grazing where it is not currently used, and where conflicts with covered activities are minimized, to reduce vegetative cover and biomass that currently excludes ground squirrel and encourage ground squirrel colonization of new areas within the Reserve System.	Monitor population trend of California ground squirrels. Analyze and quantify changes in burrowing mammal colony size over time.
Chaparral and Northern Coastal Scrub		
Goal 5. Maintain and enhance functional chaparral and northern coastal scrub communities to benefit covered species and promote native biodiversity.		
Objective 5.1. Protect 3,500 acres of chaparral and northern coastal scrub containing the full range of chaparral and northern coastal scrub community associations and manage it as part of the Reserve System within the study area.[2]	LAND-C1. Acquire 800 acres of northern mixed chaparral/chamise chaparral by fee title or conservation easement.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
	LAND-C2. Acquire 1,000 acres of mixed serpentine chaparral by fee title or conservation easement.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
	LAND-C3. Acquire 1,700 acres of northern coastal scrub/Diablan sage scrub by fee title or conservation easement.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
Objective 5.2. Enhance all acquired chaparral and northern coastal scrub land cover types by promoting regeneration and succession to sustain the natural processes and native species diversity found in these communities within the Reserve System.[3]	STUDIES-2. Determine factors relevant to the health and regeneration of native chaparral/scrub species. Targeted studies will be iniated within first 10 years of plan implementation. Use results of targeted studies to revise and improve management actions.	Conduct targeted research that identifies key factors affecting regeneration and succession of chapparal/scrub.
	CHAP-1. Conduct prescribed burns in chaparral and northern coastal scrub to maintain canopy gaps and promote regeneration. Use targeted studies to inform locations and frequency.	Monitor effects of burning on promoting canopy gaps, regeneration, and succession in chaparral and northern coastal scrub.
	CHAP-2. Mechanically thin chaparral and northern coastal scrub to promote structural diversity. Use targeted studies to inform location and frequency.	Monitor effects of mechanical thinning on promoting canopy gaps, regeneration, and succession in chaparral and northern coastal scrub.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	CHAP-3. Identify areas in the Santa Cruz Mountains, eastern mountains, and in Henry Coe State Park where adjacent natural communities (e.g. grassland, oak woodland, conifer forests) are encroaching on chaparral and scrub land cover and, if appropriate, work to reduce the spread through manual reduction.	Analyze and quantify spread of adjacent natural communities into chaparral and scrub land cover types. Study spread rate after manual reduction.
	LM-8. Negotiate with Cal Fire and other local fire-fighting agencies the use of management response measures for all fire events and fire-dependent ecosystems that minimize impacts to natural communities and covered species while protecting human life and property. All burns will be responded to, and prescribed burns will be conducted, with minimum impact suppression tactics. Burn response will take into consideration ignition location and method, seasonality, weather and availability of suppression forces.	Compare post-fire vegetation to baseline conditions at periodic intervals to assess the effect of various fire frequencies and intensities at promoting native plants and reducing non-native plants. Monitor target covered species response.
Oak and Conifer Woodland		
Goal 6. Maintain and enhance functional oak woodland communities to benefit covered species and promote native biodiversity.		
Objective 6.1. Protect 2,100 acres of valley oak woodland, 9,400 acres of mixed oak woodland and forest, 3,600 acres of coast live oak woodland and forest, 1,600 acres of blue oak woodland, 300 acres of foothill pine-oak woodland, and 100 acres of mixed evergreen forest, containing the full range of oak woodland associations and species, and that provide a matrix of pond, wetland, and upland haibtat as part of the Reserve System within the study area.[2]	LAND-OC1. Acquire in fee title or obtain conservation easements on 9,400 acres of mixed oak woodland and forest, including land in both the Santa Cruz Mountains and the Diablo Range. Target areas with a high concentration of ponds occupied by covered species or native species and/or other ponds capable of being restored.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
	LAND-OC2. Acquire 3,600 acres of coast live oak woodland and forest by fee title or conservation easement, including land in both the Santa Cruz Mountains and the Diablo Range. Target areas with a high concentration of ponds occupied by covered species or native species and/or other ponds capable of being restored.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
	LAND-OC3. Acquire 1,600 acres of blue oak woodland and 2,100 acres of valley oak woodland by fee title or conservation easement including land in both the Santa Cruz Mountains and the Diablo Range. Target areas with a high concentration of ponds occupied by covered species or native species and/or other ponds capable of being restored.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
	LAND-OC4. Acquire 300 acres of foothill pine-oak woodland and forest by fee title or conservation easement, including land in both the Santa Cruz Mountains and Diablo Range. Target areas with a high concentration of ponds occupied by covered species or native species and/or other ponds capable of being restored.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
	LAND-OC5. Acquire 100 acres of mixed evergreen forest by fee title or conservation easement including land in both the Santa Cruz Mountains and Diablo Range. Target areas with a high concentration of ponds occupied by covered species or native species and/or other ponds capable of being restored.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
Objective 6.2a. Enhance all acquired oak woodland land cover types by reducing invasive plant and animal species.[3]	LM-12. Eradicate or reduce nonnative pig disturbance within the Reserve System through trapping, hunting, or other control methods. Success criteria is achieved through ensuring disturbances by nonnative pigs do not impair the ability of the Reserve System from meeting the biological goals and objectives.	Monitor effectiveness of pig removal efforts and response of oak woodlands once pigs are removed.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	LM-14. Selectively apply herbicides or other treatments to invasive plants.	Monitor status of non-native invasive plants in target iradication areas and assess efficacy of various techniques. Monitor covered species response.
	OAK-1. Conduct prescribed burns in low-density oak woodlands to enhance the community and to reduce non-native, invasive grass cover beneath oaks and encourage growth of a native understory and oak seedlings.	Monitor effects of burning on promoting regeneration and recruitment of oak woodlands and understory landcover. Monitor covered species response.
	GRASS-1. Continue or introduce livestock and native herbivore (e.g., elk) grazing in a variety of grazing regimes.	Monitor effects of various grazing regimes on reducing nonnative plants and increasing diversity and biomass of native plants. In oak woodlands, monitor effects of various grazing regimes on oak woodland regeneration and recruitment. Monitor target covered species responses.
Objective 6.2b. Promote regeneration and recruitment of all acquired oak woodland land cover types by promoting regeneration and recruitment of component species.[3]	OAK-1. Conduct prescribed burns in low-density oak woodlands to enhance the community and to reduce non-native, invasive grass cover beneath oaks and encourage growth of a native understory and oak seedlings.	Monitor effects of burning on promoting regeneration and recruitment of oak woodlands and understory landcover. Monitor covered species response.
	GRASS-1. Continue or introduce livestock and native herbivore (e.g., elk) grazing in a variety of grazing regimes.	Monitor effects of various grazing regimes on reducing nonnative plants and increasing diversity and biomass of native plants. In oak woodlands, monitor effects of various grazing regimes on oak woodland regeneration and recruitment. Monitor target covered species responses.
Objective 6.2c. Enhance all acquired oak woodland and cover types by sustaining the natural processes found in these communities.[3]	STUDIES-3. Experimentally manage oak woodlands to reduce seedling mortality, increase seedling and sapling survival and determine factors relevant to regeneration, including browsing by mammals, birds, and insects.	Conduct targeted research that identifies key factors affecting seedling mortality, seedling and sapling survival and factors relevant to oak woodland regeneration.
	GRASS-1. Continue or introduce livestock and native herbivore (e.g., elk) grazing in a variety of grazing regimes.	Monitor effects of various grazing regimes on reducing nonnative plants and increasing diversity and biomass of native plants. In oak woodlands, monitor effects of various grazing regimes on oak woodland regeneration and recruitment. Monitor target covered species responses.
	OAK-1. Conduct prescribed burns in low-density oak woodlands to enhance the community and to reduce non-native, invasive grass cover beneath oaks and encourage growth of a native understory and oak seedlings.	Monitor effects of burning on promoting regeneration and recruitment of oak woodlands and understory landcover. Monitor covered species response.
Goal 7. Maintain and enhance functional conifer woodland communities to benefit covered species and promote native biodiversity.		
Objective 7.1. Protect 400 acres of redwood forest and 100 acres of knobcone pine woodland containing the full range of conifer woodland and forest associations and species as part of the Reserve System within the study area.[2]	LAND-OC6. Acquire 400 acres of redwood forest by fee title or conservation easement.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
	LAND-OC7. Acquire 100 acres of knobcone pine woodland by fee title or conservation easement.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
Objective 7.2. Enhance all acquired conifer woodland communities by promoting ecologically appropriate structure, density, and species composition to preserve and sustain the natural processes and native species diversity found in these communities.[3]	STUDIES-4. Experimentally manage redwood forest and knobcone pine woodland to determine factors relevant to regeneration and maintenance; possibly including prescribed burning, selective thinning, and other management actions to meet this objective.	Conduct targeted research in redwood forest, ponderosa pine woodland, and knobcone pine woodland to guide management actions and other factors relevant to regeneration and maintenance.
	OAK-2. Conduct prescribed burns in redwood forest and knobcone pine woodland to maintain or enhance native species diversity in the mid-canopy and understory.	Monitor effects of burning on promoting native species diversity.
	OAK-3. Mechanically thin the understory of redwood forest and knobcone pine woodland in target areas to promote a healthy understory/canopy.	Monitor effects of mechanical thinning on regeneration and succession in the understory and canopy of conifer woodlands. Monitor target covered species response, if applicable.
Riverine and Riparian Forest and Scrub		
Goal 8. Improve the quality of streams and the hydrologic and geomorphic processes that support them to maintain a functional aquatic and riparian community to benefit covered species and promote native biodiversity.		
Objective 8.1. Protect 100 miles of streams to promote habitat function, wildlife movement, and stream temperature moderation as part of the Reserve System within the study area.[2, 4]	STREAM-1. Exclude livestock access to target stream segments (e.g., Pacheco Creek, floodplain of Coyote Creek) using exclusion fencing, off-channel water sources, and other potential actions.	Conduct pre- and post-treatment monitoring to document vegetation and covered-species response to exclusion.
	LAND-R1. Extend the Uvas Creek Park Preserve 1.6 miles upstream to Hecker Pass Highway and setback expected development adjacent to this stream segment by a minimum of 100 feet to protect the Uvas Creek Corridor consistent with Goals 5-5, 5-7, and 5-8 of the approved City of Gilroy Hecker Pass Specific Plan. Target acquisitions will to contribute to the protection of a total of 955 acres of riparian woodland and forest in the Uvas, Llagas, and Pacheco watersheds.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
Objective 8.2. If all impacts occur, restore 12.6 stream miles on acquired fish bearing stream, as identified in Figure 3-12, within the Reseve System.[3]	STREAM-1. Exclude livestock access to target stream segments (e.g., Pacheco Creek, floodplain of Coyote Creek) using exclusion fencing, off-channel water sources, and other potential actions.	Conduct pre- and post-treatment monitoring to document vegetation and covered-species response to exclusion.
	STREAM-2. Plant and/or seed in native understory and overstory riparian vegetation within 15 feet of the edge of the low-flow channel to create structural diversity, provide overhead cover, and moderate water temperature at all riparian restoration sites.	Monitor the efficacy of seeding efforts with respect to structural diversity, overhead cover, and water temperature compared to designated reference locations. Indicator species will be selected and success criteria developed for large-scale restoration projects from the reference locations.
	STREAM-3. Plant and/or seed in native riparian vegetation in gaps in existing riparian corridors, or re-establish severally degraded or historic riparian corridors, to promote continuity within conservation lands.	STREAM-4. Plant and/or seed in native riparian vegetation in gaps in existing riparian corridors to promote continuity.
	LM-11. Graze, mow, hand-pull, to reduce non-native invasive plant species, both terrestrial and aquatic, to a level where native plants can reestablish and remain dominant within the Reserve System.	Monitor status of non-native invasive plants in target iradication areas and assess efficacy of various techniques. Monitor covered species response.
Objective 8.3. Enhance all miles of streams within the Reserve System to promote natural community functions, and habitat heterogeneity and connectivity.[3]	STREAM-4. Replace concrete, earthen or other engineered channels as part of the 12.6 miles of stream restoration to restore floodplain connectivity. Location and length will be determine by site-specific conditions.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	STREAM-5. Replace confined channels to restore floodplain connectivity and commensurate functions as part of the 12.6 miles of stream restoration. Location and length will be determine by site-specific conditions.	Conduct pre- and post-treatment monitoring of community function (performance of ecological processes); habitat composition, structure and pattern; and connectivity as part of a targeted study.
	STREAM-6. Manage watershed-wide fine sediment inputs by conditioning controls on runoff from all development projects (see Condition 3) to improve riverine habitat functions and geomorphic processes.	Conduct annual spot checks on new developments to determine whether sediment run-off provisions are consistent with the Conditions outlined in this Plan.
Goal 9. Maintain a functional riparian forest and scrub community at a variety of successional stages and improve these communities to benefit covered species and promote native biodiversity.		
Objective 9.1. Protect a minimum of 250 acres of large (at least 10 acres), contiguous stands of willow riparian forest and scrub or mixed riparian forest and woodland within the 100-year floodplain to maximize the width of native vegetation below dams to promote habitat function, wildlife movement, and stream temperature moderation as part of the Reserve System within the study area. Up to 662 acres of riparian forest and scrub will be protected if all estimated impacts occur.[2]	LAND-R2. Acquire in fee title or obtain conservation easements on lands that protect at least 290 acres and up to 349 acres of existing willow riparian forest and scrub or mixed riparian forest and woodland, including areas that provide key connectivity between existing riparian habitats in upper Coyote Creek, San Felipe Creek, Uvas Creek, Tar Creek, Little Arthur Creek, and Pacheco Creek.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
	STREAM-1. Exclude livestock access to target stream segments (e.g., Pacheco Creek, floodplain of Coyote Creek) using exclusion fencing, off-channel water sources, and other potential actions.	Conduct pre- and post-treatment monitoring to document vegetation and covered-species response to exclusion.
Objective 9.2. Protect a minimum of 40 acres of large (at least 10 acres), contiguous stands of Central California sycamore alluvial woodland within the 100-year floodplain to maximize the width of native vegetation below dams to promote habitat function, wildlife movement, and stream temperature moderation as part of the Reserve System within the study area.[2]	LAND-R3. Acquire in fee title or obtain conservation easements on lands that protect at least 40 acres of existing Central California sycamore alluvial woodland to ensure that this very rare and threatened land cover type is preserved in the study area.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
	STREAM-1. Exclude livestock access to target stream segments (e.g., Pacheco Creek, floodplain of Coyote Creek) using exclusion fencing, off-channel water sources, and other potential actions.	Conduct pre- and post-treatment monitoring to document vegetation and covered-species response to exclusion.
Objective 9.3. Restore an acre of high-quality willow riparian forest and scrub and mixed riparian forest and woodland and two acres of Central California sycamore alluvial woodland at a variety of successional stages within the Reserve System for every acre removed by covered activities (up to 381 acres of willow and mixed riparian forest and up to 18 acres of sycamore woodland if all impacts occur).[3]	STREAM-2. Plant and/or seed in native understory and overstory riparian vegetation within 15 feet of the edge of the low-flow channel to create structural diversity, provide overhead cover, and moderate water temperature at all riparian restoration sites.	Monitor the efficacy of seeding efforts with respect to structural diversity, overhead cover, and water temperature compared to designated reference locations. Indicator species will be selected and success criteria developed for large-scale restoration projects from the reference locations.
	STREAM-3. Plant and/or seed in native riparian vegetation in gaps in existing riparian corridors, or re-establish severally degraded or historic riparian corridors, to promote continuity within conservation lands.	STREAM-4. Plant and/or seed in native riparian vegetation in gaps in existing riparian corridors to promote continuity.
Objective 9.4. Enhance all riparian forest and scrub at a variety of successional stages within the Reserve System.[3]	STREAM-1. Exclude livestock access to target stream segments (e.g., Pacheco Creek, floodplain of Coyote Creek) using exclusion fencing, off-channel water sources, and other potential actions.	Conduct pre- and post-treatment monitoring to document vegetation and covered-species response to exclusion.
Objective 9.5. Restore at least 50 acres of willow riparian forest and scrub and mixed riparian woodland to increase available habitat species and enhance connectivity within the Reserve System to contribute to species recoverey.[3]	STREAM-2. Plant and/or seed in native understory and overstory riparian vegetation within 15 feet of the edge of the low-flow channel to create structural diversity, provide overhead cover, and moderate water temperature at all riparian restoration sites.	Monitor the efficacy of seeding efforts with respect to structural diversity, overhead cover, and water temperature compared to designated reference locations. Indicator species will be selected and success criteria developed for large-scale restoration projects from the reference locations.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	STREAM-3. Plant and/or seed in native riparian vegetation in gaps in existing riparian corridors, or re-establish severally degraded or historic riparian corridors, to promote continuity within conservation lands.	STREAM-4. Plant and/or seed in native riparian vegetation in gaps in existing riparian corridors to promote continuity.
Wetland and Pond		
Goal 10. Maintain, enhance, and create or restore functional pond, freshwater perennial wetland, and seasonal wetland habitats that benefit covered species and promote native biodiversity.		
Objective 10.1. Protect a minimum of 10 acres total of perennial wetlands, 5 acres total of seasonal wetlands, and 50 total acres of ponds as part of the Reserve System within the study area to contribute to species recovery, regardless of impacts.[2] Aquatic habitat preserved for the purposes of the Plan must be adjacent to permanently protected upland habitat for covered species.	LAND-WP1a. Acquire in fee title or conservation easement 10 acres of perennial freshwater wetlands suitable for covered or native species in the Santa Cruz Mountains, Santa Clara Valley, and the Diablo Range.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
	LAND-WP2a. Acquire in fee title or conservation easement 5 acres of seasonal freshwater wetlands suitable for covered or native species and/or other seasonal wetlands capable of being enhanced or restored to support covered species in the Santa Cruz Mountains, Santa Clara Valley, and the Diablo Range.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
	LAND-WP3a. Acquire in fee title or conservation easement 50 acres of ponds suitable for covered or native species in the Santa Cruz Mountains, Santa Clara Valley, and the Diablo Range.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
Objective 10.2. Protect up to 50 acres of perennial wetlands, 30 acres of seasonal wetlands, and 144 acres of ponds as part of the Reserve System if all estimated impacts occur.[2] Aquatic habitat preserved for the purposes of the Plan must be adjacent to permanently protected upland habitat for covered species	LAND-WP1b. Acquire in fee title or conservation easement up to 50 acres of perennial freshwater wetlands suitable for covered or native species in the Santa Cruz Mountains, Santa Clara Valley, and the Diablo Range.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
	LAND-WP2b. Acquire in fee title or conservation easement up to 30 acres of seasonal freshwater wetlands suitable for covered or native species and/or other seasonal wetlands capable of being enhanced or restored to support covered species in the Santa Cruz Mountains, Santa Clara Valley, and the Diablo Range.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
	LAND-WP3b. Acquire in fee title or conservation easement up to 144 acres of ponds suitable for covered or native species in the Santa Cruz Mountains, Santa Clara Valley, and the Diablo Range.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.
Objective 10.3. As determined by covered and native species needs, enhance all freshwater and seasonal wetlands and ponds by increasing native vegetative cover, biomass, and structural diversity in and around the margins within five years of pond or wetland acquisition within the Reserve System.[3]	POND-1. Install fencing that will reduce grazing pressure and exclude feral pigs on portions of ponds and wetlands and provide vegetated refuge sites for covered species. Fence installation will be carefully applied to avoid negative impacts on small mammal movement and upland habitat.	Monitor effectiveness of fencing to exclude livestock and feral pigs and compare vegetation inside of fencing to vegetation outside of fencing. Evaluate success of wetland and pond enhancement using established success criteria.
	POND-2. Install woody debris around perimeter and in submerged banks of ponds and wetlands to create basking habitat and cover for native juvenile amphibians and turtles. Materials imported from outside of the watershed shall be treated for chytrid and other potential pathogens prior to installation.	Analyze and quantify effectiveness of created basking site through routine monitoring in ponds with known western pond turtle occupancy.
	POND-3. Plant native emergent vegetation around the perimeter and in ponds and wetlands.	Monitor survivorship of planting, quantify vegetated perimeter of pond, describe habitat quality and periodically survey for species response from covered amphibians and reptiles. Evaluate success of wetland and pond enhancement using established success criteria.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	POND-4. Clear vegetation and/or remove sediment in a way that minimizes negative effects on covered species when vegetation and/or sediment restricts the ability of the aquatic environment from meeting the biological goals and objectives of the Plan.	Evaluate success of wetland and pond enhancement using established success criteria.
	LM-12. Eradicate or reduce nonnative pig disturbance within the Reserve System through trapping, hunting, or other control methods. Success criteria is achieved through ensuring disturbances by nonnative pigs do not impair the ability of the Reserve System from meeting the biological goals and objectives.	Analyze and quantify numbers of pigs irradicated and evidence of remaining population (e.g., pig observations or signs of damage).
Objective 10.4. Enhance all ponds by reducing the cover and biomass of non-native, invasive plants in the adjacent uplands between the functional perimeter of the ponds and within 0.5 miles. Pond enhancement will begin immediately after reserve unit management plans are completed or updated for each reserve unit.[3]	LM-11. Graze, mow, hand-pull, to reduce non-native invasive plant species, both terrestrial and aquatic, to a level where native plants can reestablish and remain dominant within the Reserve System.	Evaluate success of wetland and pond enhancement using established success criteria.
	LM-14. Selectively apply herbicides or other treatments to invasive plants.	Evaluate success of wetland and pond enhancement using established success criteria.
	STUDIES-5. Conduct targeted studies to determine factors limiting the expansion of the covered plant species, including but not limited to its management and micro-site needs, and implement measures to mitigate or eliminate these factors to promote occurrence expansion.	Monitor research results.
	POND-3. Plant native emergent vegetation around the perimeter and in ponds and wetlands.	Monitor survivorship of planting, quantify vegetated perimeter of pond, describe habitat quality and periodically survey for species response from covered amphibians and reptiles. Evaluate success of wetland and pond enhancement using established success criteria.
	POND-5. If biologically appropriate, graze or mechanically thin around pond perimeter to mimic grazing and promote native species.	Evaluate success of wetland and pond enhancement using established success criteria.
Objective 10.5. Enhance all ponds and wetlands within the Reserve System by eradicating or reducing density of exotic species by 95% that are detrimental to native pond and wetland biodiversity to increase number of ponds and wetlands occupied by covered species. Wetland and pond enhancement will begin immediately after reserve unit management plans are completed or updated for each reserve unit.[3]	LM-12. Eradicate or reduce nonnative pig disturbance within the Reserve System through trapping, hunting, or other control methods. Success criteria is achieved through ensuring disturbances by nonnative pigs do not impair the ability of the Reserve System from meeting the biological goals and objectives.	Analyze and quantify numbers of pigs irradicated and evidence of remaining population (e.g., pig observations or signs of damage).
	LM-13. Eradicate or reduce nonnative predators (bullfrogs, invasive fish, feral cats) within the Reserve System through habitat manipulation (e.g., periodic draining of ponds), trapping, hand capturing, electroshocking or other control methods to achieve targets identified in reserve unit management plans.	Monitor response of nonnative predators to habitat manipulation. Evaluate effect of predator abatement on native pond and wetland biodiversity. Determine presence of covered species.
	POND-1. Install fencing that will reduce grazing pressure and exclude feral pigs on portions of ponds and wetlands and provide vegetated refuge sites for covered species. Fence installation will be carefully applied to avoid negative impacts on small mammal movement and upland habitat.	Monitor effectiveness of fencing to exclude livestock and feral pigs and compare vegetation inside of fencing to vegetation outside of fencing. Evaluate success of wetland and pond enhancement using established success criteria.
Objective 10.6. Restore at least 20 acres of freshwater and seasonal wetlands to increase available habitat species and enhance connectivity among existing ponds and wetlands for covered species within the Reserve System to contribute to species recovery.[3]	POND-6. Restore 20 acres of perennial freshwater marsh within the Reserve System in suitable sites and those likely to support covered species.	Compliance monitoring. Monitor freshwater marsh and wetland restoration and assess whether success criteria are being met. Assess connectivity of restored complexes.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
Objective 10.7. In addition to the restoration of wetlands described in **Objective 10.6**, restore up to 75 acres of perennial freshwater and seasonal wetlands in-kind within the Reserve System to increase available habitat and enhance connectivity among existing ponds and wetlands for covered species if all anticipated impacts occur.[3]	POND-7. In addition to the perennial freshwater marsh restoration described in **POND-6**, restore up to 25 acres of perennial freshwater marsh within the Reserve System in the Santa Cruz Mountains, Santa Clara Valley, and Diablo Range.	Compliance monitoring. Monitor freshwater marsh and wetland restoration and assess whether success criteria are being met. Assess connectivity of restored complexes.
	POND-8. Restore up to 30 acres of seasonal wetlands within the Reserve System in the Santa Cruz Mountains, Santa Clara Valley, and Diablo Range.	Compliance monitoring. Monitor freshwater marsh and wetland restoration and assess wheter success criteria are being met. Assess connectivity of restored complexes.
Objective 10.8. Create at least 20 acres of ponds at 40 sites to increase available covered species habitat and enhance connectivity among existing ponds and wetlands within the Reserve System.[3]	POND-9. Create at least 20 acres of ponds at 40 sites, at least 10 sites in the Santa Cruz Mountains and 20 sites in the Diablo Range.	Compliance monitoring. Monitor pond construction and assess whether success criteria are being met.
Objective 10.9. In addition to the creation of ponds described in **Objective 10.8**, create up to 72 acres of ponds in-kind within the Reserve System to increase the amount available habitat and enhance connectivity among existing ponds and wetlands if all anticipated impacts occur.[3]	POND-10. In addition to the creation of ponds described in POND-9, create up to 72 acres of ponds in-kind within the Reserve System to increase the amount available habitat and enhance connectivity among existing ponds and wetlands if all anticipated impacts occur.3	Compliance monitoring. Monitor pond construction and assess whether success criteria are being met.

Notes:

[1] Nuisance defined in the California Fish & Game Code Sections 4150 and 4152

[2] Land acquisition must occur in rough step with impacts as required by the Stay-Ahead provision (see Chapter 8, Section 8.6.1). All land acquisition must be complete by Year 45. Section 5.3 of the Plan provides more detail on areas targeted for acquisition for each natural community. Reserve lands will be managed in accordance with reserve unit management plans, completed within 5 years of the acquisition of the 1st parcel within the reserve unit. The conservation strategy for aquatic land cover types includes preservation/enhancement, restoration, and/or creation. See Tables 5-14 and 5-15 for details.

[3] Habitat enhancement, monitoring, and adaptive management program, will continue in perpetuity. Restoration and creation must occur in rough step with impacts as required by the Stay Ahead provision (see Chapter 8, Section 8.6.1). All habitat restoration will be completed by Year 40 unless otherwise noted in this table. Reserve lands will be managed in accordance with reserve unit management plans, completed within 5 years of the acquisition of the 1st parcel within the reserve unit. The conservation strategy for aquatic land cover types are three fold and include preservation/enhancement, restoration, and/or creation. See Tables 5-14 and 5-15 for details.

[4] Watershed-specific targets are established for certain stream reaches within each watershed.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
Goal 11. Improve the viability of existing Bay checkerspot butterfly populations, increase the number of populations, and expand the geographic distribution to ensure the long-term persistence of the species in the study area.		
Objective 11.1. Protect 5,154 acres of modeled Bay Checkerspot butterfly habitat, including 4,600 acres of serpentine grasslands in core populations of Bay checkerspot buttery, to protect a range of slopes, aspects, and microhabitats as part of the Reserve System within the study area.[6]	LAND-G3. Acquire in fee title or obtain conservation easements on 4,600 acres of suitable serpentine grassland habitat along ridges for Bay checkerspot butterfly on Silver Creek Hills, Coyote Ridge, Pigeon Point, Tulare Hill, Santa Theresa Hills, areas west of Calero Reservoir, and the Kalanas, and Hale/Falcon Crest in fee title or conservation easement. Habitat acquisition on Coyote Ridge and Tulare Hill is top priority. For other sites totaling 554 acres, prioritize sites, threat, patch size, current occupancy and prevalence of cool microsites for Bay checkerspot butterflies.	Compliance monitoring and yearly reporting. Assess habitat quality of acquired land and prioritze areas for management according to threat, patch size, current occupancy and prevalence of cool microsites for Bay checkerspot butterflies.
	LAND-L5. Acquire in fee title or obtain easements on 3,400 acres of serpentine grassland along Coyote Ridge to link existing protected areas and to create a large core reserve for serpentine grassland species to move within (Linkage 6 in Table 5-9 and Figure 5-6). These acreages are inclusive of, not in addition to, acquisition targets set in LAND-G3.	Compliance monitoring for land acquisition. Analyze and quantify movement of indicator species to determine whether linkages are functioning as intended.
Objective 11.2. Increase the number of larval host plant populations and adult nectar sources and and reduce the amount of thatch to a level that supports the long term viability of the Bay checkerspot butterfly on sites with degraded serpentine grassland within the Reserve System.[7]	GRASS-1. Continue or introduce livestock and native herbivore (e.g., elk) grazing in a variety of grazing regimes.	Monitor effects of various grazing regimes on increasing larval host plants and numbers of Bay checkerspot butterflies.
	GRASS-2. Conduct prescribed burns. Use targeted studies to inform methods, timing, location, and frequency.	Monitor effects of prescribed burns on increasing larval host plants and numbers of Bay checkerspot butterflies.
	GRASS-3. Conduct mowing in selected areas to mimic grazing where use of livestock is impractical.	Monitor effects of mowing on larval host plants, adult host plants, numbers of Bay checkerspot butterflies, and non-native invasive plant species.
Objective 11.3 Decrease nitrogen deposition in serpentine grassland to reduce non-native, invasive plant growth in the Reserve System.	GRASS-4. Conduct selected seeding of native forbs and grasses in the Reserve System.	Monitor effects of mowing on larval host plants, adult host plants, numbers of Bay checkerspot butterflies, and non-native invasive plant species.
	GRASS-7. Implementing Entity will initiate translocation efforts if natural colonization fails after five seasons in which core populations are at above-average population sizes. Through coordination with species experts and regulatory agencies translocate Bay checkerspot butterflies (eggs, larvae, or adults) from core populations into suitable but unoccupied sites if natural dispersal fails to reestablish population.	Monitor at periodic intervals the success of translocation efforts in establishing new populations of Bay checkerspot butterfly.
	LM-11. Graze, mow, hand-pull, to reduce non-native invasive plant species, both terrestrial and aquatic, to a level where native plants can reestablish and remain dominant within the Reserve System.	Monitor relationship between nonnative plant abundance and Bay checkerspot butterfly.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
Goal 12. Maintain or increase the breeding population of golden eagles in the study area.		
Objective 12.1. Protect 54,995 acres of modeled golden eagle habitat (i.e., annual grassland, oak woodland, and rock outcrops) in areas suitable for nesting and foraging golden eagles in the Diablo Range and Santa Cruz Mountains as part of the Reserve System within the study area.[6]	LAND-G4. Acquire in fee title or obtain conservation easements on 2,500 acres of primary modeled habitat in fee title or obtain conservation easements on sites with secluded rock outcrops or large trees overlooking open grassland in the Diablo Range and Santa Cruz Mountains.	Compliance monitoring and yearly reporting. Monitor presence/absence of golden eagles in target areas.
	LAND-G5. Acquire in fee title or obtain conservation easements on 52,495 acres of grasslands with existing ground squirrel colonies (i.e., modeled secondary habitat) in the Diablo Range and Santa Cruz Mountains.	Compliance monitoring and yearly reporting. Monitor presence/absence of golden eagles in target areas.
Objective 12.2. Enhance golden eagle foraging habitat by expanding the range, population number, and population density of ground squirrel populations, within local carrying capacity, within the Reserve System.[7]	GRASS-5. Prohibit use of rodenticides within the Reserve System and, when possible, outside of the Reserve System, except when needed to protect the integrity of structures, such as levees, stock ponds and dams, or to prevent nuisance populations on adjacent private lands.1	Monitor population trend (i.e., number, density, range) of California ground squirrels in target areas.
	GRASS-6. Introduce livestock grazing where it is not currently used, and where conflicts with covered activities are minimized, to reduce vegetative cover and biomass that currently excludes ground squirrel and encourage ground squirrel colonization of new areas within the Reserve System.	Identify candidate grassland sites within the Reserve System to provide expansion areas for ground squirrel colonies.
Goal 13. Increase the size and sustainability of the breeding population and increase the distribution of breeding and wintering burrowing owls in the study area and the expanded burrowing owl conservation area.		
Objective 13.1. Protect 23,000 acres of modeled western burrowing owl overwintering habitat (i.e., grassland, oak woodland, or barren land) and retain temporary or permanent management agreements on 5,250 acres of nesting habitat (occupied or potential) on the valley floor and in the Diablo Range as part of the Reserve System within the study area.[6] The geographic breakdown should be: 3,700 acres in the North San Jose/Baylands region, 800 acres in the Gilroy region, 500 acres in the Morgan Hill region, and 250 acres in the South San Jose region as shown in Figure 5-13. Prioritize sites that contain occupied burrowing owl breeding sites.	LAND-G6. Acquire, obtain easements, or retain management agreements on burrowing owl nesting habitat within 2 miles the San Jose Water Pollution Control Plant Bufferlands, north of Highway 237.	
	LAND-G7. Acquire, obtain easements, or retain management agreements on burrowing owl nesting habitat within 2 miles of the San Jose International Airport or other important northern San Jose breeding sites.	
	LAND-G8. Acquire or obtain easements on 27,000 acres of suitable overwintering habitat in the Diablo Range that support ground squirrel populations or could support them with improved management. This acreage is inclusive of the targets identified in LAND-G6 and LAND-G7.	Compliance monitoring and yearly reporting. Monitor presence/absence of burrowing owl in target areas.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
Objective 13.2. Enhance through improved management 3,700 acres of burrowing owl nesting habitat in the North San Jose/Baylands burrowing owl conservation region, 800 acres in the Gilroy burrowing owl conservation region, 500 acres in the Morgan Hill burrowing owl conservation region, and 250 acres in the South San Jose burrowing owl conservation region to encourage expansion of burrowing owls within the Reserve System.[7]	GRASS-5. Prohibit use of rodenticides within the Reserve System and, when possible, outside of the Reserve System, except when needed to protect the integrity of structures, such as levees, stock ponds and dams, or to prevent nuisance populations on adjacent private lands.1	Monitor population trend (i.e., number, density, range) of California ground squirrels in target areas.
	GRASS-6. Introduce livestock grazing where it is not currently used, and where conflicts with covered activities are minimized, to reduce vegetative cover and biomass that currently excludes ground squirrel and encourage ground squirrel colonization of new areas within the Reserve System.	Identify candidate grassland sites within the Reserve System to provide expansion areas for ground squirrel colonies.
	GRASS-8. Implement vegetation management (i.e., graze/mow) that reduces vegetation height and density to optimal conditions for burrowing owls.	Monitor status of burrowing owl population and correlate species response to vegetation management.
	GRASS-9. Create and maintain artificial burrows to encourage colonization of sites where ground squirrels establishment is not feasible or during the interim before ground squirrel colonies naturally establish.	Monitor artificial burrow for occupancy twice annually, during the breeding season.
Goal 14. Increase the ability of San Joaquin kit fox to move into and within the study area and provide habitat to increase the likelihood of breeding.		
Objective 14.1. Protect 5,000 acres of annual grassland and suitable oak woodland land cover types in a diversity of soils types and other environmental gradients to improve San Joaquin kit fox movement and potential breeding habitat as part of the Reserve System within the study area.[6]	LAND-G9. Acquire in fee title or obtain easements on 5,000 acres of annual grassland and suitable oak woodland types (e.g., oak savanna and oak woodland within 500 feet of annual grassland) north and south of Highway 152 in modeled San Joaquin kit fox habitat.	Compliance monitoring and yearly reporting. Monitor presence/absence of kit fox in target areas.
Objective 14.2. Increase the population size and density of the prey base for San Joaquin kit fox.[7]	GRASS-5. Prohibit use of rodenticides within the Reserve System and, when possible, outside of the Reserve System, except when needed to protect the integrity of structures, such as levees, stock ponds and dams, or to prevent nuisance populations on adjacent private lands.1	Monitor population trend (i.e., number, density, range) of California ground squirrels in target areas.
	GRASS-6. Introduce livestock grazing where it is not currently used, and where conflicts with covered activities are minimized, to reduce vegetative cover and biomass that currently excludes ground squirrel and encourage ground squirrel colonization of new areas within the Reserve System.	Identify candidate grassland sites within the Reserve System to provide expansion areas for ground squirrel colonies.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
Objective 14.3. Educate the public about land management techniques that are compatible with kit fox movement within the southeastern portion of the study area.[7]	GRASS-10. Conduct at least one public education campaign in the southeastern portion of the study area within the first 10 years of implementation to provide landowners with information about management and land use techniques that are more compatible with movement and use by San Joaquin kit fox. Conduct additional meetings as needed.	Ensure that at least one educational meeting is conducted within the first two years of implementation and then as needed after that.
Objective 14.4. Increase the number of undercrossings, by a minimum of one, that are considered passable and safe for San Joaquin kit fox or increase the safety of at least two existing crossings across Highway 152 between the Highway 152/156 interchange and the Santa Clara/Merced County line. Identify target crossings by conducting a feasibility study by year 5 of Plan implementation (see Objective 2.1).[7,10]	LM-1. Remove fences and roads in areas where they are no longer needed and where their removal could increase the permeability of the study area for wildlife.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-2. When replacing small culverts ensure that the culvert has a natural bottom and is large enough for larger mammals such as deer and mountain lions to pass, if feasible. Culverts must provide direct movement from one side of the road to the other and ensure that the culvert is visible to the target species (i.e., do not obscure entrance with vegetation). Install fencing or other features that will direct wildlife towards the culvert or other safe crossing within the first 20 years of implementation.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-3. Where structurally possible, replace culverts with free span bridges to ensure free movement for wildlife under roadways.	Compliance monitoring for infrastructure/structure removal, replacement, or installation. Monitor wildlife movement (or plant distribution if applicable) in target areas. Monitor movement of indicator species for connectivity.
	LM-4. Ensure that median barrier removal and/or median perforations are considered as alternatives during project design.	Monitor wildlife movement in target areas. Monitor movement of indicator species for connectivity.
	LM-5. Remove median barriers or perforate sections of median barriers along roadways to improve successful wildlife crossings and install fencing or other features to direct wildlife to those open sections within first 20 years of implementation. Use feasibility study to determine location and length of barrier removal.	Compliance monitoring. Monitor wildlife movement in target areas. Monitor movement of indicator species for connectivity.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
Goal 15. Provide for the expansion of a breeding population of least Bell's vireos into the study area and increase reproductive success of least Bell's vireo.		
Objective 15.1. Protect 700 acres of modeled Least Bell's vireo habitat (i.e., riparian woodland or forest with a dense understory (<3m tall) in the Uvas, Llagas, Pajaro, or Pacheco Watersheds in south Santa Clara County) as part of the Reserve System.[6] Target areas will contain occupied or potential least Bell's vireo habitat.	LAND-R1. Extend the Uvas Creek Park Preserve 1.6 miles upstream to Hecker Pass Highway and setback expected development adjacent to this stream segment by a minimum of 100 feet to protect the Uvas Creek Corridor consistent with Goals 5-5, 5-7, and 5-8 of the approved City of Gilroy Hecker Pass Specific Plan. Target acquisitions will to contribute to the protection of a total of 955 acres of riparian woodland and forest in the Uvas, Llagas, and Pacheco watersheds.	Compliance monitoring and yearly reporting. Assess habitat quality of acquired land and prioritze areas for management.
	LAND-R4. Acquire fee title or obtain conservation easements along 4.0 miles of the Pajaro River between the Santa Clara/Santa Cruz/San Benito County lines (just west of Sargent Creek) and up to Miller Canal to protect stream and riparian habitat and provide opportunities for habitat restoration. Target acquisitions will to contribute to the protection of riparian woodland and forest (see Goal 9).	Compliance monitoring and yearly reporting. Assess habitat quality of acquired land and prioritze areas for management.
Objective 15.2. Restore a minimum of 50 acres of riparian woodland and forest and up to 399 acres in the Uvas, Llagas, or Pacheco Watersheds within the Reserve System.[7] Target areas that contain occupied or potential least Bell's vireo habitat.	LM-11. Graze, mow, hand-pull, to reduce non-native invasive plant species, both terrestrial and aquatic, to a level where native plants can reestablish and remain dominant within the Reserve System.	Monitor status of non-native invasive plants in target iradication areas and assess efficacy of various techniques. Monitor covered species response.
	STREAM-2. Plant and/or seed in native understory and overstory riparian vegetation within 15 feet of the edge of the low-flow channel to create structural diversity, provide overhead cover, and moderate water temperature at all riparian restoration sites.	Monitor survivorship of plantings/seedings as part of restoration and enhancement efforts and periodically survey for species response from least Bell's vireo, yellow-legged frog and other covered species.
	STREAM-3. Plant and/or seed in native riparian vegetation in gaps in existing riparian corridors, or re-establish severally degraded or historic riparian corridors, to promote continuity within conservation lands.	Monitor survivorship of plantings/seedings as part of restoration and enhancement efforts and periodically survey for species response from least Bell's vireo, yellow-legged frog and other covered species.
	STREAM-4. Replace concrete, earthen or other engineered channels as part of the 12.6 miles of stream restoration to restore floodplain connectivity. Location and length will be determine by site-specific conditions.	Compliance monitoring. Conduct pre- and post-treatment monitoring of riparian vegetation as part of a targeted study.
	STREAM-5. Replace confined channels to restore floodplain connectivity and commensurate functions as part of the 12.6 miles of stream restoration. Location and length will be determine by site-specific conditions.	Compliance monitoring. Conduct pre- and post-treatment monitoring of riparian vegetation as part of a targeted study.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
Objective 15.3. Reduce the abundance of nest predators in target areas (i.e., occupied and potential habitat) in order to increase reproductive success of least Bell's vireo in riparian areas within the Reserve System.[7]	STREAM-7. Implement a brown-headed cowbird control program in coordination with species experts and regulatory agencies that will reduce the impact of brood parasitism on least Bell's vireo nest success, if least Bell's vireos become regular nesters in the study area (>3 nests over at least two consecutive years) and brown-headed cowbird eggs are discovered in vireo nests.	Compliance monitoring. Monitor for riparian song bird nesting within least Bell's vireo modeled habitat. Periodically, every 5 years, monitor for least Bell's vireo outside of modeled habitat to document range expansion. Quanitfy the number of occurences of brood parasitism that are occuring and if/when brown-headed cowbird control program is initiated and efficacy of program.
Goal 16. Conserve existing populations of the foothill yellow-legged frog population where possible and increase the overall population of foothill yellow-legged frog in biologically appropriate locations in the study area.		
Objective 16.1. Protect 80 stream miles of modeled foothill yellow-legged frog habitat that currently have, or historically had, perennial flows as part of the Reserve System within the study area.[6] Target streams that contain occupied or potential foothill yellow-legged frog habitat.	LAND-R5. Acquire or obtain easements along 80 miles of perennial streams located above Uvas, Calero, Chesbro, Anderson, or in Uvas Creek below Uvas Reservoir, Upper Penitencia Creek, Alamitos Creek or Guadalupe Creek that have or could be restored to have cobblestone substrate and consistent, gentle flows from late March to late May.	Monitor status of non-native invasive plants in target iradication areas and assess efficacy of various techniques. Monitor covered species response.
Objective 16.2. Enhanced all acquired stream miles and restore 11.6 stream miles of perennial streams located above Uvas, Calero, Chesbro, Anderson, or Coyote Reservoirs or in Uvas Creek below Uvas Reservoir, Upper Penitencia Creek, Alamitos Creek or Guadalupe Creek.[7] Target streams that contain occupied or potential foothill yellow-legged frog habitat.	LM-14. Selectively apply herbicides or other treatments to invasive plants.	Monitor status of non-native invasive plants in target iradication areas and assess efficacy of various techniques. Monitor covered species response.
	STREAM-2. Plant and/or seed in native understory and overstory riparian vegetation within 15 feet of the edge of the low-flow channel to create structural diversity, provide overhead cover, and moderate water temperature at all riparian restoration sites.	Monitor survivorship of plantings/seedings as part of restoration and enhancement efforts and periodically survey for species response from least Bell's vireo, yellow-legged frog and other covered species.
	STREAM-4. Replace concrete, earthen or other engineered channels as part of the 12.6 miles of stream restoration to restore floodplain connectivity. Location and length will be determine by site-specific conditions.	Compliance monitoring. Conduct pre- and post-treatment monitoring of in-stream habitat as part of a targeted study.
	STREAM-5. Replace confined channels to restore floodplain connectivity and commensurate functions as part of the 12.6 miles of stream restoration. Location and length will be determine by site-specific conditions.	Compliance monitoring. Conduct pre- and post-treatment monitoring of floodplain function as part of a targeted study.
	STREAM-8. Increase the amount of cobblestone substrate suitable to support breeding foothill yellow-legged frogs to 2,000 ft to areas close to known occurrence(s) of foothill yellow-legged frog or immediately upstream or downstream of known occurrences or other high quality foothill yellow-legged frog breeding habitat.	Assess yellow-legged frog response to increase in cobblestone substrate as part of a targeted study.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	STUDIES-6. Conduct a directed study to censuses egg masses in breeding habitat downstream of reservoirs before and after the pulse flow releases to determine whether eggs masses were lost.	Monitor effects of pulse flows on foothill yellow-legged frog.
Goal 17: Conserve existing populations of California red-legged frog, California tiger salamander, and western pond turtle populations where possible, and increase the number of individuals and expand the overall distribution of populations of these species in biologically appropriate locations within the study area to maintain viable populations andcontribute to the regional recovery of these species.		
Objective 17.1. Protect California red-legged frog modeled primary (1,830 acres), refugia (7,700 acres), and dispersal (35,095 acres) habitat, California tiger salamander modeled breeding (220 acres) and non-breeding (51,700 acres) habitat, and western pond turtle primary (11,800 acres) and secondary (42,100 acres) habitat as part of the Reserve System within the study area. Aquatic habitat will only be protected if adjacent upland habitat suitable for the terrestrial needs of these species are also protected.[6, 8]	LAND-WP4. Acquire habitat that is adjacent to permanently protected aquatic resources with a high potential to support CRLF and is in the East San Francisco Bay Recovery Unit for red-legged frog *(USFWS 2002)* (Coyote Creek, Pacheco, and Pescadero Watersheds).	Compliance monitoring and yearly reporting. Assess habitat quality of acquired land and prioritze areas for management.
	LAND-WP5. Acquire habitat that contains a matrix of aquatic and upland habitats and is also adjacent to Joseph D. Grant County Park, Palassou Ridge Open Space Preserve, southeast of Henry Coe State Park, Santa Cruz Mountain foothills, and Calero County Park in areas where dense forest is absent to reduce competition with other native amphibians (e.g., California newts).	Compliance monitoring and yearly reporting. Assess habitat quality of acquired land and prioritze areas for management.
	LAND-WP6a. Acquire stream segments or ponds that currently provide or could provide high quality basking, breeding, and nesting habitat (vegetated banks and at least 150 feet of adjacent upland habitat) for western pond turtle.	Compliance monitoring and yearly reporting. Assess habitat quality of acquired land and prioritze areas for management.
	LAND-WP6b. Acquire stream segments or ponds that currently provide or could provide high quality basking, breeding, and nesting habitat (vegetated banks and at least 0.5 miles of adjacent upland habitat) for California tiger salamander.	Monitor the removal of barriers within the reserve system to ensure that the highest priority barriers are removed first. Analyze and quantify any potential positive (native fish movement) and negative (spread of exotic species) effects of barrier removal during targeted study phase of implementation.
Objective 17.2. Protect corridors between existing protected areas to ensure genetic exchange within and movement between populations of covered amphibians and aquatic reptiles as part of the Reserve System within the study area.[6] Target corridors include Linkages 4, 5, 12, 13, 14, 15, and 16 (Table 5-6, Figure 5-6).	LAND-WP7. Acquire habitat near Santa Teresa Hills and Tulare Hill to provide connectivity between populations in the Diablo Range and the Santa Cruz foothills.	Compliance monitoring and yearly reporting. Assess habitat quality of acquired land and prioritze areas for management.
	LAND-G2. Acquire 15,500 acres of annual grassland by fee title or conservation easement as part of the Reserve System. Target areas on both sides of Santa Clara Valley with a high concentration of ponds occupied by covered species or native species and/or other ponds capable of being restored. Acquisition of native grassland will be given priority.	Compliance monitoring and yearly reporting. Assess use by covered amphibians and aquatic reptiles and experimentally manage to improve habitat for movement.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	LAND-OC1. Acquire in fee title or obtain conservation easements on 9,400 acres of mixed oak woodland and forest, including land in both the Santa Cruz Mountains and the Diablo Range. Target areas with a high concentration of ponds occupied by covered species or native species and/or other ponds capable of being restored.	Compliance monitoring and yearly reporting. Assess use by covered amphibians and aquatic reptiles and experimentally manage to improve habitat for movement.
	LAND-OC2. Acquire 3,600 acres of coast live oak woodland and forest by fee title or conservation easement, including land in both the Santa Cruz Mountains and the Diablo Range. Target areas with a high concentration of ponds occupied by covered species or native species and/or other ponds capable of being restored.	Compliance monitoring and yearly reporting. Assess use by covered amphibians and aquatic reptiles and experimentally manage to improve habitat for movement.
	LAND-OC3. Acquire 1,600 acres of blue oak woodland and 2,100 acres of valley oak woodland by fee title or conservation easement including land in both the Santa Cruz Mountains and the Diablo Range. Target areas with a high concentration of ponds occupied by covered species or native species and/or other ponds capable of being restored.	Compliance monitoring and yearly reporting. Assess use by covered amphibians and aquatic reptiles and experimentally manage to improve habitat for movement.
	LAND-OC4. Acquire 300 acres of foothill pine-oak woodland and forest by fee title or conservation easement, including land in both the Santa Cruz Mountains and Diablo Range. Target areas with a high concentration of ponds occupied by covered species or native species and/or other ponds capable of being restored.	Compliance monitoring and yearly reporting. Assess use by covered amphibians and aquatic reptiles and experimentally manage to improve habitat for movement.
	LAND-OC5. Acquire 100 acres of mixed evergreen forest by fee title or conservation easement including land in both the Santa Cruz Mountains and Diablo Range. Target areas with a high concentration of ponds occupied by covered species or native species and/or other ponds capable of being restored.	Compliance monitoring and yearly reporting. Assess use by covered amphibians and aquatic reptiles and experimentally manage to improve habitat for movement.
Objective 17.3. Enhance a minimum of 50 acres of ponds, 15 acres of wetlands, and 100 miles of streams in the Reserve System by eradicating or reducing exotic species and competitor species (such as nonnative pet-store turtles) that are detrimental to covered amphibians, aquatic reptiles, and native pond biodiversity. Enhance up to 144 acres of ponds and 80 acres of wetlands if all estimated impacts occur.[7]	LM-12. Eradicate or reduce nonnative pig disturbance within the Reserve System through trapping, hunting, or other control methods. Success criteria is achieved through ensuring disturbances by nonnative pigs do not impair the ability of the Reserve System from meeting the biological goals and objectives.	Conduct surveys every 5 years in areas of traditionally high feral pig populations to determine what the population levels are relative to baseline. Monitor response of California red-legged frog, California tiger salamander, and western pond turtle to control of exotic and competitor species as part of a targeted study.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	LM-13. Eradicate or reduce nonnative predators (bullfrogs, invasive fish, feral cats) within the Reserve System through habitat manipulation (e.g., periodic draining of ponds), trapping, hand capturing, electroshocking or other control methods to achieve targets identified in reserve unit management plans.	Monitor response of nonnative predators to habitat manipulation. Monitor response of California red-legged frog, California tiger salamander, and western pond turtle to control of exotic and competitor species
	STREAM-1. Exclude livestock access to target stream segments (e.g., Pacheco Creek, floodplain of Coyote Creek) using exclusion fencing, off-channel water sources, and other potential actions.	Conduct pre- and post-treatment monitoring to document vegetation and covered-species response to exclusion.
	STREAM-2. Plant and/or seed in native understory and overstory riparian vegetation within 15 feet of the edge of the low-flow channel to create structural diversity, provide overhead cover, and moderate water temperature at all riparian restoration sites.	Monitor the efficacy of seeding efforts with respect to structural diversity, overhead cover, and water temperature compared to designated reference locations. Indicator species will be selected and success criteria developed for large-scale restoration projects from the reference locations.
	STREAM-3. Plant and/or seed in native riparian vegetation in gaps in existing riparian corridors, or re-establish severally degraded or historic riparian corridors, to promote continuity within conservation lands.	STREAM-4. Plant and/or seed in native riparian vegetation in gaps in existing riparian corridors to promote continuity.
	POND-11. Offer financial and regulatory (Safe Harbor Agreement) incentives to private landowners to enhance pond and wetland habitat to suit breeding California red-legged frog, California tiger salamander, and western pond turtle.	Compliance monitoring.
	POND-12. Educate the public that the use of any salamander species as bait is illegal in the State of California.	Compliance monitoring.
Objective 17.4. Restore a minimum of 20 acres of perennial wetlands and 1 miles of streams for the California red-legged frog, California tiger salamander, and western pond turtle to maintain or increase breeding populations of covered amphibians and reptiles. Restore up to 45 acres of perennial wetlands, 30 acres of seasonal wetlands, and 11.6 miles of stream if all estimated impacts occur. [7]	POND-1. Install fencing that will reduce grazing pressure and exclude feral pigs on portions of ponds and wetlands and provide vegetated refuge sites for covered species. Fence installation will be carefully applied to avoid negative impacts on small mammal movement and upland habitat.	Conduct pre- and post-treatment monitoring to document vegetation and covered-species response to exclusion.
	POND-2. Install woody debris around perimeter and in submerged banks of ponds and wetlands to create basking habitat and cover for native juvenile amphibians and turtles. Materials imported from outside of the watershed shall be treated for chytrid and other potential pathogens prior to installation.	Analyze and quantify effectiveness of created basking site through routine monitoring in ponds with known western pond turtle occupancy.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	POND-3. Plant native emergent vegetation around the perimeter and in ponds and wetlands.	Monitor survivorship of planting, quantify vegetated perimeter of pond, describe habitat quality and periodically survey for species response from covered amphibians and reptiles. Evaluate success of wetland and pond enhancement using established success criteria.
	POND-4. Clear vegetation and/or remove sediment in a way that minimizes negative effects on covered species when vegetation and/or sediment restricts the ability of the aquatic environment from meeting the biological goals and objectives of the Plan.	Monitor status of non-native invasive plants in target iradication areas and assess efficacy of various techniques. Monitor covered species response.
	POND-13. Excavate sections of ponds to provide deeper pools that will be utilized by California red-legged frog adults and sub-adults and western pond turtles, while maintaining shallow areas to provide rearing habitat for California red-legged frog tadpoles, California tiger salamander larvae, and western pond turtle hatchlings.	Monitor use of excavated pond by red-legged frog and western pond turtles as part of a targeted study.
	STUDIES-7. In the case of ponds, wetlands, and/ or amphibian populations becoming infected with chytrid fungus or other diseases, use the best scientific information available to manage and stop spread of epidemic.	Monitor for the presence of disease. Monitor efficacy of disease control actions.
	STUDIES-8. Identify the distribution and risk to existing indigenous populations of covered amphibians and reptiles from hybridization (e.g., California tiger salamander hybridizing with Texas salamander) within the Reserve System. Appendix M, Calfornia Tiger Salamander Hybridization, will serve as the Management Plan for CTS hybridization issues and will be updated throughout the permit term for adaptive managment purposes.	Monitor for the presence of non-natives and hybrids. Test and document efficacy of management plan.
	STUDIES-9. Annually identify and maintain upland breeding sites (even if sites are not “natural”) for western pond turtle because of the high fidelity of use from year to year .	Monitor use of protected sites to determine factors influencing nest success in areas of known turtle use.
	GRASS-1. Continue or introduce livestock and native herbivore (e.g., elk) grazing in a variety of grazing regimes.	Monitor effects of various grazing regimes on increasing habitat for red-legged frog, western pond turtle and California tiger salamander
	GRASS-2. Conduct prescribed burns. Use targeted studies to inform methods, timing, location, and frequency.	Monitor effects of prescribed burning on increasing habitat for red-legged frog, western pond turtle and California tiger salamander

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	LM-11. Graze, mow, hand-pull, to reduce non-native invasive plant species, both terrestrial and aquatic, to a level where native plants can reestablish and remain dominant within the Reserve System.	Monitor status of non-native invasive plants in target iradication areas and assess efficacy of various techniques. Monitor covered species response.
	LM-14. Selectively apply herbicides or other treatments to invasive plants.	Monitor effects of herbicide application on reducing nonnative species and ensure that herbicide use has no unwanted effects on native amphibain population.
Objective 17.5. Create a minimum of 20 acres of ponds to provide new breeding sites for California red-legged frog, California tiger salamander, and western pond turtle within the Reserve System. Create up to 92 acres of ponds if all estimated impacts occur.[7]	POND-1. Install fencing that will reduce grazing pressure and exclude feral pigs on portions of ponds and wetlands and provide vegetated refuge sites for covered species. Fence installation will be carefully applied to avoid negative impacts on small mammal movement and upland habitat.	Monitor pond creation and assess whether success criteria are being met. Monitor use of created ponds by covered amphibians and western pond turtle.
	POND-2. Install woody debris around perimeter and in submerged banks of ponds and wetlands to create basking habitat and cover for native juvenile amphibians and turtles. Materials imported from outside of the watershed shall be treated for chytrid and other potential pathogens prior to installation.	Analyze and quantify effectiveness of created basking site through routine monitoring in ponds with known western pond turtle occupancy.
	POND-3. Plant native emergent vegetation around the perimeter and in ponds and wetlands.	Monitor survivorship of planting, quantify vegetated perimeter of pond, describe habitat quality and periodically survey for species response from covered amphibians and reptiles. Evaluate success of wetland and pond enhancement using established success criteria.
	POND-4. Clear vegetation and/or remove sediment in a way that minimizes negative effects on covered species when vegetation and/or sediment restricts the ability of the aquatic environment from meeting the biological goals and objectives of the Plan.	Monitor status of non-native invasive plants in target iradication areas and assess efficacy of various techniques. Monitor covered species response.
	POND-9. Create at least 20 acres of ponds at 40 sites, at least 10 sites in the Santa Cruz Mountains and 20 sites in the Diablo Range.	Monitor pond creation and assess whether success criteria are being met. Monitor use of created ponds by covered amphibians and western pond turtle.
	POND-10. In addition to the creation of ponds described in POND-9, create up to 72 acres of ponds in-kind within the Reserve System to increase the amount available habitat and enhance connectivity among existing ponds and wetlands if all anticipated impacts occur.3	Monitor pond creation and assess whether success criteria are being met. Monitor use of created ponds by covered amphibians and western pond turtle.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	POND-11. Offer financial and regulatory (Safe Harbor Agreement) incentives to private landowners to enhance pond and wetland habitat to suit breeding California red-legged frog, California tiger salamander, and western pond turtle.	Compliance monitoring.
	POND-13. Excavate sections of ponds to provide deeper pools that will be utilized by California red-legged frog adults and sub-adults and western pond turtles, while maintaining shallow areas to provide rearing habitat for California red-legged frog tadpoles, California tiger salamander larvae, and western pond turtle hatchlings.	Monitor use of excavated pond by red-legged frog and western pond turtles as part of a targeted study.
	STUDIES-7. In the case of ponds, wetlands, and/ or amphibian populations becoming infected with chytrid fungus or other diseases, use the best scientific information available to manage and stop spread of epidemic.	Monitor for the presence of disease. Monitor efficacy of disease control actions.
	STUDIES-8. Identify the distribution and risk to existing indigenous populations of covered amphibians and reptiles from hybridization (e.g., California tiger salamander hybridizing with Texas salamander) within the Reserve System. Appendix M, Calfornia Tiger Salamander Hybridization, will serve as the Management Plan for CTS hybridization issues and will be updated throughout the permit term for adaptive managment purposes.	Monitor for the presence of non-natives and hybrids. Test and document efficacy of management plan.
	STUDIES-9. Annually identify and maintain upland breeding sites (even if sites are not “natural”) for western pond turtle because of the high fidelity of use from year to year .	Monitor use of protected sites to determine factors influencing nest success in areas of known turtle use.
	GRASS-1. Continue or introduce livestock and native herbivore (e.g., elk) grazing in a variety of grazing regimes.	Monitor effects of various grazing regimes on increasing habitat for red-legged frog, western pond turtle and California tiger salamander
	GRASS-2. Conduct prescribed burns. Use targeted studies to inform methods, timing, location, and frequency.	Monitor effects of prescribed burning on increasing habitat for red-legged frog, western pond turtle and California tiger salamander
	LM-11. Graze, mow, hand-pull, to reduce non-native invasive plant species, both terrestrial and aquatic, to a level where native plants can reestablish and remain dominant within the Reserve System.	Monitor status of non-native invasive plants in target iradication areas and assess efficacy of various techniques. Monitor covered species response.
	LM-14. Selectively apply herbicides or other treatments to invasive plants.	Monitor effects of herbicide application on reducing nonnative species and ensure that herbicide use has no unwanted effects on native amphibain population.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
Goal 18. Increase the population size of tricolored blackbird to enhance the viability of the species in the study area.		
Objective 18.1. Protect and enhance at least 4 tricolored blackbird breeding sites that support, historically supported, or could support tricolored blackbird colonies as part of the Reserve System within the study area.[6] Each site must include at least 2-acres of breeding habitat and have foraging habitat within 2 miles.	LAND-WP8. Acquire in fee title or through a conservation easement at least 4 tricolored blackbird breeding sites that support, historically supported, or could support tricolored blackbird colonies each with at least 2-acres of breeding habitat and foraging habitat within 2 miles. Target at least 5 acres of suitable breeding habitat for tricolored blackbird within dry land farming or ranching complexes in the Santa Clara Valley and the Diablo Range	Compliance monitoring and yearly reporting. Assess habitat quality of acquired land and prioritze areas for management.
	POND-14. Offer financial or regulatory incentives (Safe Harbor Agreement, if listed) to private landowners to enhance pond and marsh habitat to suit breeding tricolored blackbirds, and to ensure that dry-land farming and ranching activities support breeding tricolored blackbirds.	Compliance Monitoring.
Objective 18.2. Protect and enhance 200 acres of suitable tricolored blackbird foraging habitat within 2 miles of protected and occupied breeding sites as part of the Reserve System within the study area.[6]	LAND-WP9. Acquire 200 acres of foraging habitat for tricolored blackbird in areas where there are protected breeding sites within 2 miles.	Compliance monitoring and yearly reporting. Monitor presence/absence of foraging habitat.
	POND-15 Offer financial incentives to private landowners to ensure that dry-land farming and ranching activities support foraging tricolored blackbirds.	Compliance Monitoring.
Objective 18.3. Enhance or restore 5 acres of suitable tricolor blackbird breeding habitat in historically/currently occupied areas within the Reserve System.[7]	POND-1. Install fencing that will reduce grazing pressure and exclude feral pigs on portions of ponds and wetlands and provide vegetated refuge sites for covered species. Fence installation will be carefully applied to avoid negative impacts on small mammal movement and upland habitat.	Conduct pre- and post-treatment monitoring to document vegetation and covered-species response to exclusion.
	POND-16. Restore freshwater marsh, seasonal wetlands, and/or ponds that will support dense reed-like vegetation (cattails) or other native vegetation that will attract nesting tricolored blackbirds.	Compliance monitoring. Monitor habitat restoration and assess whether success criteria are being met. Monitor use of restored habitat by tricolored blackbird.
	POND-17. In areas with non-native vegetation (e.g., Himalayan blackberry) that supports existing tricolored blackbird colonies, initiate a gradual (3-4 year) transition from non-native vegetation to native vegetation that is structurally similar.	Determine areas where tricolored blackbirds are using non-native vegetation and ensure that there is a management plan in place to control the spread of the non-native vegetation and transition the colony to native vegetation if necessary.
	POND-18. Restore up to 30 acres of seasonal wetlands within the Reserve System in the Santa Clara Valley.	Compliance monitoring. Monitor habitat restoration and assess whether success criteria are being met. Monitor use of restored habitat by tricolored blackbird.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	STREAM-4. Replace concrete, earthen or other engineered channels as part of the 12.6 miles of stream restoration to restore floodplain connectivity. Location and length will be determine by site-specific conditions.	Compliance monitoring. Conduct pre- and post-treatment monitoring of riparian vegetation as part of a targeted study.
Objective 18.4. Restore a minimum of 20 acres of freshwater wetland suitable for tricolored blackbird breeding habitat within 2 miles of suitable and foraging habitat to encourage colonization of new sites within the Reserve System. Restore up to 45 acres of freshwater wetlands if all estimated impacts occur.[7] The acreage targets in this objective are inclusive of targets identified in Objective 20.3.	POND-19. Restore a minium of 20 acres and up to 45 acres of freshwater marsh within the Reserve System in the Santa Cruz Mountains, Santa Clara Valley, and Diablo Range.	Compliance monitoring. Monitor habitat restoration and assess whether success criteria are being met. Monitor use of restored habitat by tricolored blackbird.
Objective 18.5. Create a minium of 20 acres of ponds to provide new nest colony sites for tricolored blackbird within the Reserve System. Create up to 92 acres of ponds if all estimated impacts occur.[7]	POND-9. Create at least 20 acres of ponds at 40 sites, at least 10 sites in the Santa Cruz Mountains and 20 sites in the Diablo Range.	Monitor pond creation and assess wheter success criteria are being met. Monitor use of created ponds by covered amphibians, western pond turtle, and tricolored blackbird.
	POND-10. In addition to the creation of ponds described in POND-9, create up to 72 acres of ponds in-kind within the Reserve System to increase the amount available habitat and enhance connectivity among existing ponds and wetlands if all anticipated impacts occur.3	Monitor pond creation and assess wheter success criteria are being met. Monitor use of created ponds by covered amphibians, western pond turtle, and tricolored blackbird.
Goal 19. Provide for the expansion of a breeding and foraging population of Townsend's western big-eared bat into the study area.		
Objective 19.1. Protect and enhance 400 acres of redwood forest and 10 acres of rock outcrops within the study area as part of the Reserve System to provide breeding habitat for Townsend's big-eared bat.[6]	LAND-OC8. Acquire 400 acres of redwood forest that could provide suitable breeding habitat for Townsend's big-eared bat. Prioritize redwood forest according to distance from human disturbance, patch size, current occupancy and prevalence of large cavities inside trees.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management. Document and monitor species status at sites identified as potential habitat.
	LAND-G10. Acquire 10 acres of large rock outcrops that could provide suitable breeding habitat for Townsend's big-eared bat. Prioritize areas with large rock outcrops according to distance from human disturbance, patch size, current occupancy and prevalence of caves, tunnels and mines.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management. Document and monitor species status at sites identified as potential habitat.
Objective 19.2. Enhance breeding habitat and roosting sites for Townsend's big-eared bat within the Reserve System to increase the number of occupied and potential breeding sites within the Reserve System.[7]	LM-15. The 10 existing box-girder bridges (bat-friendly design) will be maintained by the County when replaced or repaired and an additional 6 bridges will be converted to box-girder design to increase available bridge roosting habitat in the study area.	Monitor exisiting and new roosts for evidence of occupancy and determine factors that influence site use.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	STUDIES-10. Using an experimental approach, establish one artificial breeding site in each of the following habitat types: grasslands, rock outcrops and isolated redwood and ponderosa pine forests.	Monitor artificial breeding sites for evidence of occupancy and determine factors that influence site use.
Objective 19.3: Protect 1,700 acres of coastal scrub, 17,100 acres of oak woodlands, and at least 290 and up to 349 acres of riparian areas within the Reserve System to provide foraging habitat for Townsend's big-eared bat.[6]	LAND-L6. Acquire in fee title or obtain easements on at least 3,000 acres of grassland, chaparral & coastal scrub, and oak woodland natural communities south of Henry W. Coe State Park to link this core reserve with extensive wetlands surrounding San Felipe Lake in San Benito County (Linkage 14 in Table 5-9 and Figure 5-6).	Compliance monitoring for land acquisition. Analyze and quantify movement of indicator species to determine whether linkages are functioning as intended.
	LAND- L7. Acquire in fee title or obtain easements on at least 2,300 acres of grassland, chaparral & coastal scrub, and oak woodland natural communities in the NE corner of the study area to link the core reserve that includes Joseph Grant County Park with SFPUC lands and other protected lands in Alameda County (Linkage 4 in Table 5-9 and Figure 5-6).	Compliance monitoring for land acquisition. Analyze and quantify movement of indicator species to determine whether linkages are functioning as intended.
	LAND-L8. Acquire in fee title or obtain easements on at least 650 acres of grassland, chaparral & coastal scrub, and oak woodland natural communities to connect Almaden Quicksilver County Park with protected open space to the east near Calero Lake (Linkage 9 in Table 5-9 and Figure 5-6).	Compliance monitoring for land acquisition. Analyze and quantify movement of indicator species to determine whether linkages are functioning as intended.
	LAND-L9. Acquire in fee title or obtain easements on 2,000 acres of conifer woodland, riparian forest & scrub, oak woodland, and grassland natural communities, in the portion of the Pescadero Watershed that is in the study area and along the Pajaro River, to maintain wildlife connections between the Santa Cruz Mountains and the Gabilan Range outside the study area (Linkages 18, 19, and 20 in Table 5-9 and Figure 5-6).	Compliance monitoring for land acquisition. Analyze and quantify movement of indicator species to determine whether linkages are functioning as intended.
	LAND-R2. Acquire in fee title or obtain conservation easements on lands that protect at least 290 acres and up to 349 acres of existing willow riparian forest and scrub or mixed riparian forest and woodland, including areas that provide key connectivity between existing riparian habitats in upper Coyote Creek, San Felipe Creek, Uvas Creek, Tar Creek, Little Arthur Creek, and Pacheco Creek.	Compliance monitoring and annual reporting. Assess habitat quality of acquired land and prioritize areas for management.

Biological Goals and Objectives	Conservation Actions	Monitoring Action

Notes:

[1] Nuisance defined in the Fish & Game Code Sections 4150 and 4152

[2] May focus instead on barrier removal in North County because District does not control all sites with barriers. Stream acquisition in the Coyote/Guadalupe systems will be very limited due to urbanization and relatively high levels of existing protection.

[3] Appropriate stream reaches will be further refined and defined in the objective or in the text.

[4] FAHCE criteria will be used.

[6] Land acquisition must occur in rough step with impacts as required by the Stay Ahead provision (see Chapter 8, Section 8.6.1). All land acquisition must be completed by Year 45. Section 5.4 of the Plan provides more detail on areas targeted for acquisition for each species. Reserve lands will be managed in accordance with reserve unit management plans, completed within 5 years of the acquisition of the 1st parcel within the reserve unit.

[7] Habitat enhancement, monitoring, and adaptive management program, will continue in perpetuity. Restoration and creation must occur in rough step with impacts as required by the Stay Ahead provision (see Chapter 8, Section 8.6.1). All habitat restoration will be completed by year 40 unless otherwise noted in this table. Reserve lands will be managed in accordance with reserve unit management plans, completed within 5 years of the acquisition of the 1st parcel within the reserve unit. All plans will be reviewed and approved by the Wildlife Agencies. The conservation strategy for aquatic land cover types includes preservation/enhancement, restoration, and/or creation. See Tables 5-14 and 5-15 for details.

[8] These occupied acreages are minimum requirements for each species that utilizes each referenced land cover type.

[9] Riffles with high invertebrate productivity, usually the result of a relatively open canopy that allows more sunlight and increased primary productivity in the riffle.

[10] Design will be based on the best available science and be consistent with Condition 6 in Chapter 6, Design and Construction Requirements for Covered Transportation Projects

Table 5-1d. Biological Goals, Objectives and Conservation Actions: Plants

Biological Goals and Objectives	Conservation Actions	Monitoring Action
Goal 20. Maintain viability, protect, and increase the size and number of populations of covered serpentine plant species, including Coyote ceanothus, Santa Clara Valley dudleya, Metcalf Canyon jewelflower, most beautiful jewelflower, smooth lessingia, fragrant fritillary, Mt. Hamilton thistle, Loma Prieta hoita, and Tiburon Indian paintbrush, within the study area.[1]		
Objective 20.1. Protect and enhance the known extant occurrences of Coyote ceanothus as part of the Reserve System within the study area, including a buffer zone of 500 feet around each occurrence to reduce external influences and a minimum occurrence size of 2,000 individuals.[4,5,7]	LAND-P1. Acquire in fee title or conservation easement sites in the study area that support three unprotected occurrences of Coyote ceanothus and provide the necessary buffer between incompatible land uses.	Compliance monitoring and annual reports.
	STUDIES-5. Conduct targeted studies to determine factors limiting the expansion of the covered plant species, including but not limited to its management and micro-site needs, and implement measures to mitigate or eliminate these factors to promote occurrence expansion.	Monitor results of research and the effects of its application.
	STUDIES-11. Conduct experimental burning in protected occurrences of targeted covered plant species to determine the importance of fire for plant regeneration.	Monitor burning on known occurrences of Coyote ceanothus and species response.
	STUDIES-12. Ensure seeds from natural occurrences in the Study Area are stored and maintained at a minimum of one Center for Plant Conservation certified botanic garden.	Monitor viability of seed collection and refresh collection, as necessary.
	CHAP-1. Conduct prescribed burns in chaparral and northern coastal scrub to maintain canopy gaps and promote regeneration. Use targeted studies to inform locations and frequency.	Monitor burning on known occurrences of Coyote ceanothus and species response.
	CHAP-2. Mechanically thin chaparral and northern coastal scrub to promote structural diversity. Use targeted studies to inform location and frequency.	Monitor the impacts of grazing or other vegetation management techniques on known occurrences of Coyote ceanothus.
	LM-8. Negotiate with Cal Fire and other local fire-fighting agencies the use of management response measures for all fire events and fire-dependent ecosystems that minimize impacts to natural communities and covered species while protecting human life and property. All burns will be responded to, and prescribed burns will be conducted, with minimum impact suppression tactics. Burn response will take into consideration ignition location and method, seasonality, weather and availability of suppression forces.	Monitor all covered plants following a wildfire.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
Objective 20.2. Establish two new occurrences of Coyote ceanothus in the Reserve System to reduce risk of extinction. Conduct targeted studies to determine feasibility of occurrence creation and identify locations and propagation/planting techniques.[6]	STUDIES-13. Identify suitable locations for and establish target number of new covered plant occurrences in the Reserve System.	Compliance monitoring and annual reports.
	STUDIES-14. Determine suitable propagation or planting techniques for targeted covered plant species and determine biologically appropriate seed sampling techniques from existing occurrences.	Monitor newly established and source occurrences.
	STUDIES-15. Design and implement field experiments (if the number of propagules will not be significantly impacted) to test alternative techniques for establishment of targeted covered plant occurrences. Field experiments will be continue until target number of occurrences are established.	Monitor the results of all experiments.
Objective 20.3. Protect at least 55 occurrences of Santa Clara Valley dudleya as part of the Reserve System within the study area, including a buffer zone of 500 feet around each occurrence to reduce external influences and promote expansion of occurrences.[2,4,5]	LAND-P2. Acquire in fee title or conservation easement sites in the study area that support 55 occurrences of Santa Clara Valley dudleya across a range of elevational gradients on both sides of Coyote Valley to ensure geographic diversity in protected occurrences.	Compliance monitoring and annual reports.
	STUDIES-12. Ensure seeds from natural occurrences in the Study Area are stored and maintained at a minimum of one Center for Plant Conservation certified botanic garden.	Monitor viability of seed collection and refresh collection, as necessary.
Objective 20.4. Increase the size of Santa Clara Valley dudleya occurrences to ensure each occurrence has at least 2,000 individuals within the Reserve System.[4,6,7]	STUDIES-5. Conduct targeted studies to determine factors limiting the expansion of the covered plant species, including but not limited to its management and micro-site needs, and implement measures to mitigate or eliminate these factors to promote occurrence expansion.	Monitor the results and application of research on Santa Clara Valley dudleya
	STUDIES-16. Monitor the effects of livestock grazing (or predation by other species, e.g., black-tailed jackrabbit) on targeted covered plant species by conducting exclusion experiments and monitoring effects on occurrences, including control sites in the monitoring plan.	Monitor the effects of grazing on management on covered plant species.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
Objective 20.5. Protect at least three currently unprotected occurrences and adequate lands to create ten new occurrences of Metcalf Canyon jewelflower, including a buffer zone of 500 feet around each occurrence to reduce external influences and promote expansion of occurrences.[4,5]	LAND-P3. Acquire in fee title or conservation easement sites in the study area that support three occurrences of Metcalf Canyon jewelflower.	Compliance Monitoring; Yearly Reports
	STUDIES-12. Ensure seeds from natural occurrences in the Study Area are stored and maintained at a minimum of one Center for Plant Conservation certified botanic garden.	Monitor viability of seed collection and refresh collection, as necessary.
Objective 20.6. Create at least ten new occurrences and expand the size of all Metcalf Canyon jewelflower occurrences in the Reserve System to at least 2,000 individuals.[4,6,7]	LAND-P4. Acquire north side of Tulare Hill to promote reintroduction of Metcalf Canyon jewelflower on west side of Valley.	Compliance Monitoring; Yearly Reports
	STUDIES-5. Conduct targeted studies to determine factors limiting the expansion of the covered plant species, including but not limited to its management and micro-site needs, and implement measures to mitigate or eliminate these factors to promote occurrence expansion.	Monitor the results and application of research on Metcalf Canyon jewelflower
	STUDIES-14. Determine suitable propagation or planting techniques for targeted covered plant species and determine biologically appropriate seed sampling techniques from existing occurrences.	Monitor newly established and source occurrences.
	STUDIES-15. Design and implement field experiments (if the number of propagules will not be significantly impacted) to test alternative techniques for establishment of targeted covered plant occurrences. Field experiments will be continue until target number of occurrences are established.	Monitor the results of all experiments.
	STUDIES-17. Monitor Metcalf Canyon jewelflower and most beautiful jewelflower introgression and develop protocols to protect the genetic integrity of both species.	Monitor the results of research and success of developed protocols.
Objective 20.7. Protect at least 17 occurrences of most beautiful jewelflower, including a buffer zone of 500 feet around each occurrence to reduce external influences and promote expansion of occurrence.[4,5]	LAND-P5. Acquire sites in the study area that support 17 occurrences of most beautiful jewelflower.	Compliance monitoring and annual reports.
	STUDIES-12. Ensure seeds from natural occurrences in the Study Area are stored and maintained at a minimum of one Center for Plant Conservation certified botanic garden.	Monitor viability of seed collection and refresh collection, as necessary.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	STUDIES-17. Monitor Metcalf Canyon jewelflower and most beautiful jewelflower introgression and develop protocols to protect the genetic integrity of both species.	Monitor the results of research and success of developed protocols.
Objective 20.8. Increase the size of most beautiful jewelflower occurrences to ensure each occurrence has at least 2,000 individuals.[4,6,7]	STUDIES-5. Conduct targeted studies to determine factors limiting the expansion of the covered plant species, including but not limited to its management and micro-site needs, and implement measures to mitigate or eliminate these factors to promote occurrence expansion.	Monitor the results and application of research on most beautiful jewelflower
	STUDIES-14. Determine suitable propagation or planting techniques for targeted covered plant species and determine biologically appropriate seed sampling techniques from existing occurrences.	Monitor newly established and source occurrences.
Objective 20.9. Protect at least 22 occurrences of Mount Hamilton thistle as part of the Reserve System within the study area, inlcuding a buffer zone of 500 feet around each occurrence to reduce external influences and promote expansion of occurrence.[3,4,5]	LAND-P6. Acquire sites in the study area that support Mount Hamilton thistle in drainages or spring systems and stratify protection on both sides of Coyote Valley to ensure geographic diversity in protected occurrences.	Compliance monitoring and annual reports.
	STUDIES-12. Ensure seeds from natural occurrences in the Study Area are stored and maintained at a minimum of one Center for Plant Conservation certified botanic garden.	Monitor viability of seed collection and refresh collection, as necessary.
Objective 20.10. Increase the size of Mt. Hamilton thistle occurences within the Reserve System to at least 2,000 individuals to ensure each occurrence has a viable number of individuals each year. Conduct targeted studies to determine feasibility of expanding occurrences.[4,6,7]	STUDIES-5. Conduct targeted studies to determine factors limiting the expansion of the covered plant species, including but not limited to its management and micro-site needs, and implement measures to mitigate or eliminate these factors to promote occurrence expansion.	Monitor the results and application of research on Mt. Hamilton thistle.
	STUDIES-16. Monitor the effects of livestock grazing (or predation by other species, e.g., black-tailed jackrabbit) on targeted covered plant species by conducting exclusion experiments and monitoring effects on occurrences, including control sites in the monitoring plan.	Monitor the effects of grazing on management on covered plant species.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
Objective 20.11. Protect at least 12 occurrences of smooth lessingia as part of the Reserve Systerm within the study area, inlcuding a buffer zone of 150-meter (500 foot) buffer around each occurrence to reduce external influences and promote expansion of occurrences.[4,5]	LAND-P7. Acquire sites in the Reserve System that support eight occurrences of smooth lessingia.	Compliance monitoring and annual reports.
	STUDIES-12. Ensure seeds from natural occurrences in the Study Area are stored and maintained at a minimum of one Center for Plant Conservation certified botanic garden.	Monitor viability of seed collection and refresh collection, as necessary.
Objective 20.12. Locate or create at least 12 new occurrences of smooth lessingia and increase the size of all occurrence to ensure each occurrence has at least 2,000 individuals within the Reserve System.[4,6,7]	STUDIES-5. Conduct targeted studies to determine factors limiting the expansion of the covered plant species, including but not limited to its management and micro-site needs, and implement measures to mitigate or eliminate these factors to promote occurrence expansion.	Monitor the results and application of research on smooth lessingia.
	STUDIES-14. Determine suitable propagation or planting techniques for targeted covered plant species and determine biologically appropriate seed sampling techniques from existing occurrences.	
	STUDIES-16. Monitor the effects of livestock grazing (or predation by other species, e.g., black-tailed jackrabbit) on targeted covered plant species by conducting exclusion experiments and monitoring effects on occurrences, including control sites in the monitoring plan.	Monitor the effects of grazing on management on covered plant species.
Objective 20.13. Protect at least four occurences of fragrant fritillary as part of the Reserve System within the study area, including a buffer zone of 500 feet around each occurence to reduce external influences and promote expansion of occurrences.[5]	LAND-P8. Acquire sites along Coyote Ridge that support the four remaining unprotected fragrant fritillary occurrences.	Compliance monitoring and annual reports.
	STUDIES-12. Ensure seeds from natural occurrences in the Study Area are stored and maintained at a minimum of one Center for Plant Conservation certified botanic garden.	Monitor viability of seed collection and refresh collection, as necessary.
Objective 20.14. Increase the size of fragrant fritillary occurrences within the Reserve System to ensure each occurrence has a viable number of individuals each year.[7]	STUDIES-5. Conduct targeted studies to determine factors limiting the expansion of the covered plant species, including but not limited to its management and micro-site needs, and implement measures to mitigate or eliminate these factors to promote occurrence expansion.	Monitor the results and application of research on fragrant fritillary.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	STUDIES-16. Monitor the effects of livestock grazing (or predation by other species, e.g., black-tailed jackrabbit) on targeted covered plant species by conducting exclusion experiments and monitoring effects on occurrences, including control sites in the monitoring plan.	Monitor the effects of grazing on management on covered plant species.
Objective 20.15. Protect the one known occurrence of Tiburon Indian Paintbrush within the permit area that is not currently permantently protected as part of the Reserve System, including a buffer zone of 500 feet around each occurrence to reduce external influences.[4]	LAND-P9. Acquire the Tiburon Indian paintbrush occurrence located at the Kirby Canyon landfill mititation site prior to or at the time the temporary conservation easement expires.	
	STUDIES-12. Ensure seeds from natural occurrences in the Study Area are stored and maintained at a minimum of one Center for Plant Conservation certified botanic garden.	Monitor viability of seed collection and refresh collection, as necessary.
Objective 20.16. Increase the size of the protected Tiburon Indian paintbrush occurence within the Reserve System to ensure occurrence has at least 2,000 individuals.[4,6,7]	STUDIES-5. Conduct targeted studies to determine factors limiting the expansion of the covered plant species, including but not limited to its management and micro-site needs, and implement measures to mitigate or eliminate these factors to promote occurrence expansion.	Monitor the results and application of research on Tiburon Indian paintbrush.
	STUDIES-16. Monitor the effects of livestock grazing (or predation by other species, e.g., black-tailed jackrabbit) on targeted covered plant species by conducting exclusion experiments and monitoring effects on occurrences, including control sites in the monitoring plan.	Monitor the effects of grazing on management on covered plant species.
Goal 21. Protect and increase the size and number of coverd non-serpentine plant populations to maintain viability of San Francisco collinsia and Loma Prieta hoita within the study area.		
Objective 21.5. Protect or create three occurrences of San Francisco collinsia within the Reserve System including a buffer zone of 500 feet around each occurrence to reduce external influences. Prioritize occurrence protection over creation.[4,5,6]	LAND-P10. Acquire in fee title or conservation easement sites that support San Francisco collinsia.	Compliance monitoring and annual reports.
	STUDIES-12. Ensure seeds from natural occurrences in the Study Area are stored and maintained at a minimum of one Center for Plant Conservation certified botanic garden.	Monitor viability of seed collection and refresh collection, as necessary.
	STUDIES-13. Identify suitable locations for and establish target number of new covered plant occurrences in the Reserve System.	Compliance monitoring and annual reports.

Biological Goals and Objectives	Conservation Actions	Monitoring Action
	STUDIES-14. Determine suitable propagation or planting techniques for targeted covered plant species and determine biologically appropriate seed sampling techniques from existing occurrences.	Monitor newly established and source occurrences.
	STUDIES-15. Design and implement field experiments (if the number of propagules will not be significantly impacted) to test alternative techniques for establishment of targeted covered plant occurrences. Field experiments will be continue until target number of occurrences are established.	Monitor the results of all experiments.
Objective 21.6. Increase the size of existing or new occurrence of San Francisco collinsia in the Reserve System.[6,7]	STUDIES-5. Conduct targeted studies to determine factors limiting the expansion of the covered plant species, including but not limited to its management and micro-site needs, and implement measures to mitigate or eliminate these factors to promote occurrence expansion.	Monitor the results and application of research on San Francisco collinsia.
Objective 21.7. Protect four currently unprotected occurrences of Loma Prieta hoita in the study area as part of the Reserve System including a buffer zone of 500 feet around each occurrence to reduce external influences.[4,5]	LAND-P11. Acquire four sites in the study area that supports Loma Prieta hoita.	Compliance monitoring and annual reports.
	STUDIES-12. Ensure seeds from natural occurrences in the Study Area are stored and maintained at a minimum of one Center for Plant Conservation certified botanic garden.	Monitor viability of seed collection and refresh collection, as necessary.
Objective 21.8. Increase the size of protected Loma Prieta hoita occurrences within the Reserve System.[6,7]	STUDIES-5. Conduct targeted studies to determine factors limiting the expansion of the covered plant species, including but not limited to its management and micro-site needs, and implement measures to mitigate or eliminate these factors to promote occurrence expansion.	Monitor the results and application of research on Loma Prieta hoita.

Biological Goals and Objectives	Conservation Actions	Monitoring Action

Notes:

[1] For the purposes of this Plan, a plant occurrence is defined as a group of individuals that are separated by at least 0.25 mile from other groups of individuals of the same species or subspecies, consistent with how plants are tracked by the CNDDB. In some cases, an occurrence may be equivalent to a population; in other cases, multiple occurrences may form a single population. A biological population is defined differently for each of the covered plants and is often unknown due to a lack of population data. Therefore, an occurrence provides a single standard by which to measure impacts and conservation for all covered plants. During implementation, the Implementing Entity may conduct monitoring or management actions based on populations, which is a more biologically meaningful unit.

[2] Objectives that require protection of plant occurrence require that those occurrences be in currently unprotected land.

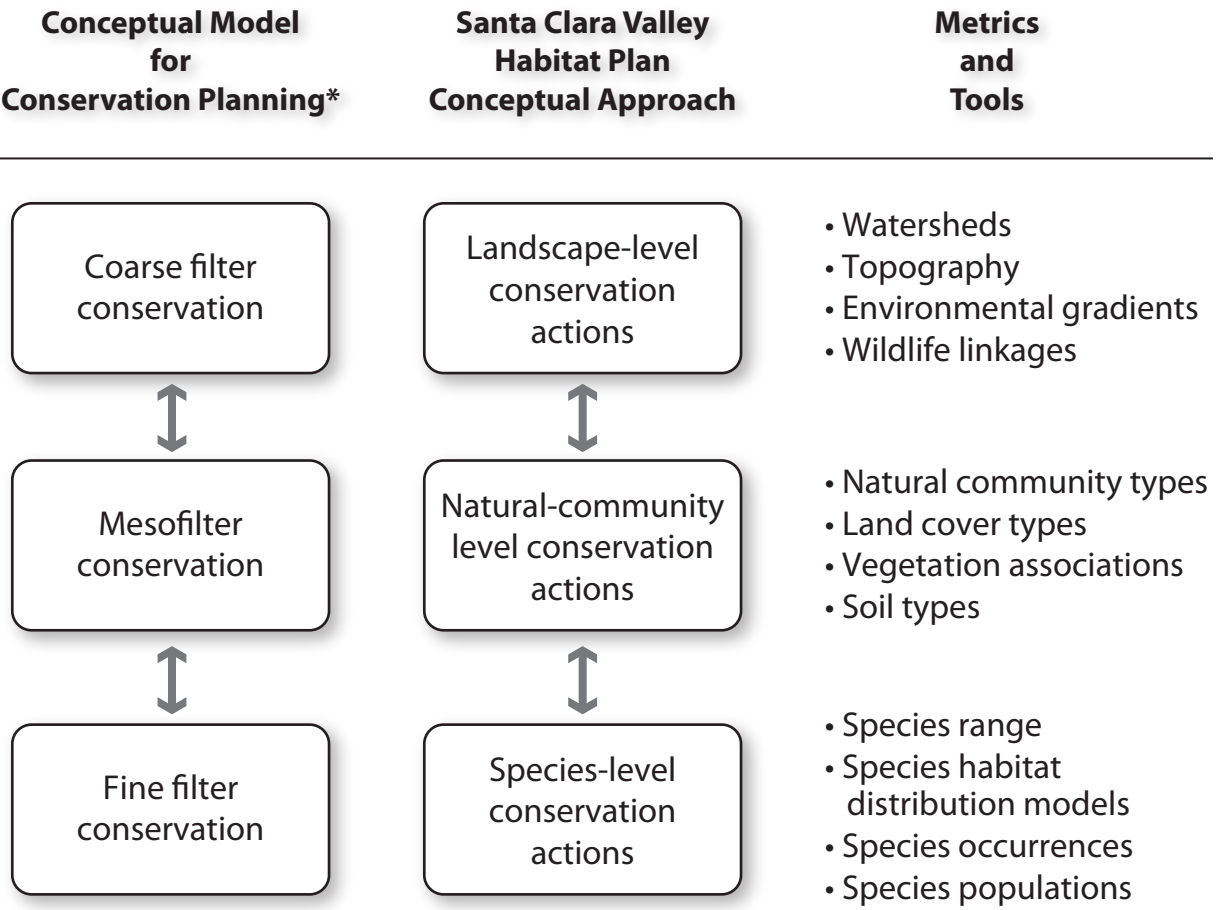
[3] For Mount Hamilton thistle population on the east side of Coyote Valley are defined as all occurrences in a discrete drainage; while population on the west side of Coyote Valley are defined as each occurrence point.

[4] Source for buffer width and minimum population size: USFWS Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area (1998c)

[5] Land acquisition must occur in rough step with impacts as required by the Stay Ahead provision (see Chapter 8, Section 8.6.1). All land acquisition must be complete by Year 45 . Land acquisition requiring restoration or creation of habitat for Covered Species must be complete by Year 40. Reference Table 5-29 for interim land acquisition timelines.

[6] Habitat enhancement, monitoring, and adaptive management program, will continue in perpetuity. Restoration and creation must occur in rough step with impacts as required by the Stay-Ahead provision (see Chapter 8, Section 8.6.1). All habitat restoration will be completed by year 40.

[7] The target number of individuals per occurrence will be adjusted or established as necessary pending research carried out during Plan implementation to assure viable occurrences of each covered plant species.



* Source: Hunter (2005)

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Figure 5-1
Conceptual Model and Conceptual Approach to the Conservation Strategy for the Santa Clara Valley Habitat Plan

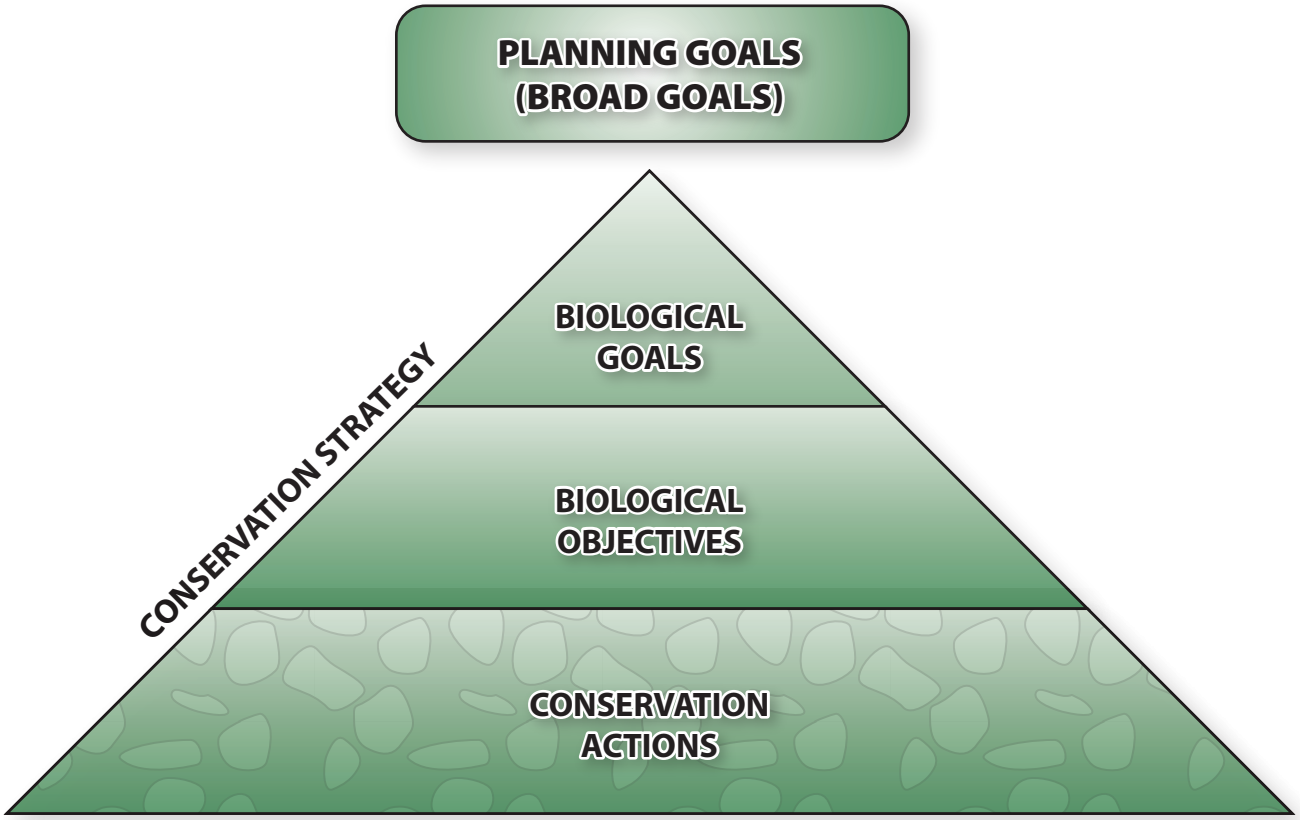

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Figure 5-2
Structure of the Biological Goals and Objectives

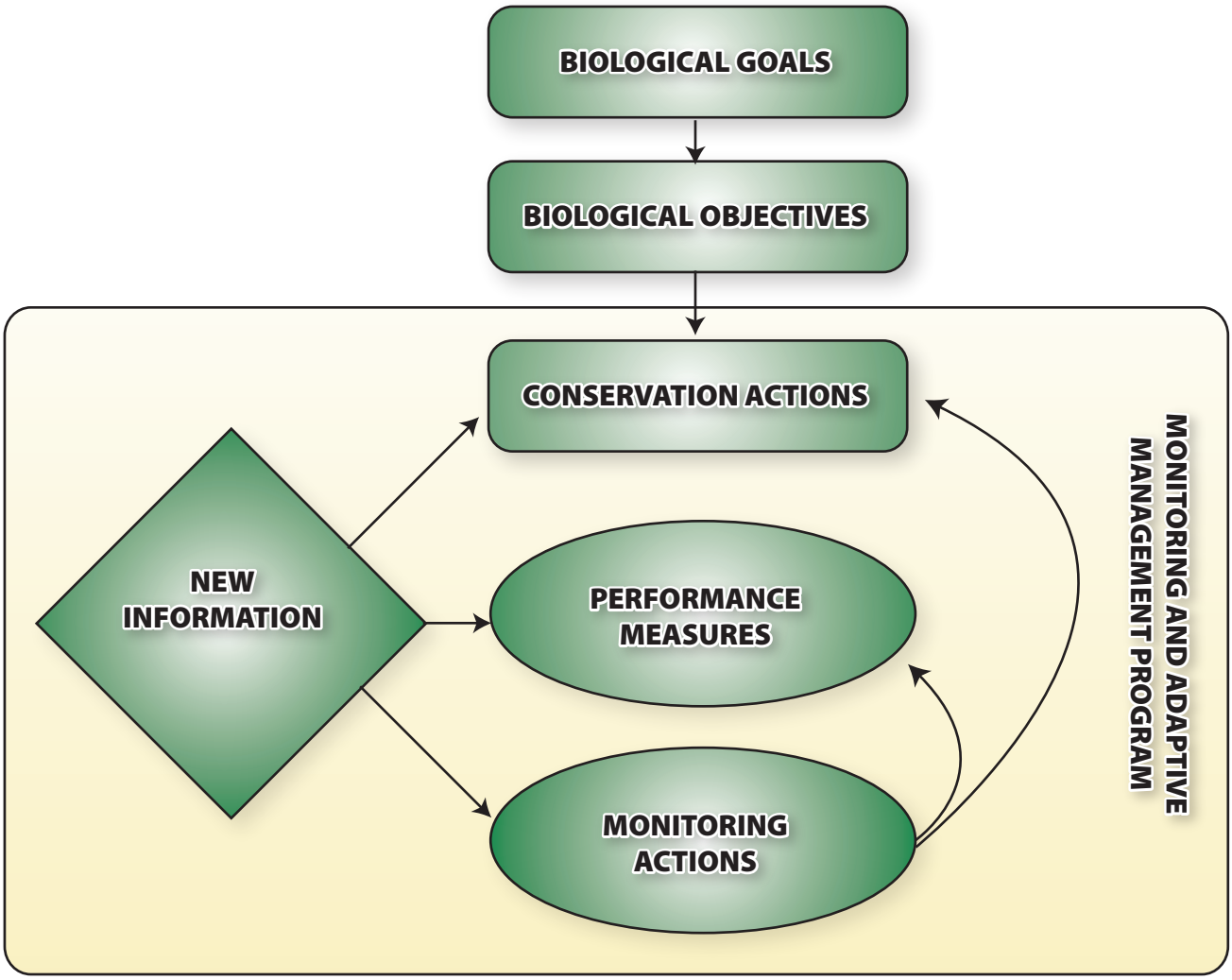

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Figure 5-3
Relationship of Biological Goals and Objectives to Adaptive Management and Monitoring