Final

Santa Clara Valley Habitat Plan

Santa Clara County, California

Volume 3 of 4:
Chapter 7, Monitoring and Adaptive Management Program
Chapter 8, Plan Implementation
Chapter 9, Costs and Funding
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Chapter 7

Monitoring and Adaptive Management Program

7.1 Introduction

This chapter describes the monitoring and adaptive management program for the Plan. The purposes of this program are to ensure compliance with the Plan; to assess the status of covered and other native species, natural communities, and ecosystem processes within the Reserve System[1] and in certain habitat types outside of the Reserve System; and to evaluate the effects of management actions such that the conservation strategy described in Chapter 5, including the biological goals and objectives (**Tables 5-1a–d**)[2] of the Plan are achieved. Adaptive management and monitoring will be integrated into one cohesive program where monitoring will inform and change management actions to continually improve outcomes for covered and other native species and natural communities. An overview of the program, monitoring and management actions, and data and reporting requirements are found below. Monitoring issues and tools relevant to the three levels of the conservation strategy (landscape, natural community, and species) are described in detail in **Appendix J**.

7.1.1 Regulatory Context

By regulation, an HCP must incorporate monitoring of conservation measures and the response of covered species to these measures (50 CFR 17.22[b][1][iii] and 50 CFR 222.22[b][5][iii]). An adaptive management strategy is a recommended component of Plans with data gaps that would substantively affect how the species is managed and monitored in the future (65 FR 35251). The USFWS and NMFS Five-Point Policy (65 FR 35241–35257) describes adaptive management as an integrated method for addressing uncertainty in natural resource management and states that management must be linked to measurable

[1] In general conservation actions and monitoring take place within the Reserve System (i.e., lands acquired, managed, and monitored by the Implementing Entity to benefit covered species under this Plan). Monitoring for burrowing owl and tricolored blackbirds will extend beyond the Reserve System boundaries as described below. Monitoring outside of the Reserve System will still occur within the Plan's study area.

[2] The biological goals and objectives conform to the guidance provided by the Five Point Policy as much as feasible, given the scope of the conservation strategy and the fact that the Reserve System has not yet been acquired. In some cases, details on the indicator, location, timeframe, etc. are provided in the narrative text of the conservation strategy. In other cases these details will be developed during early implementation where on-the-ground information can better inform specific management actions for specific parcels. These details will be integrated into the reserve management plans.

biological goals and monitoring. To that end, **Tables 5-1a–d** integrate biological goals and objectives, conservation actions, and monitoring actions to ensure that the program evaluates the conservation measures and assesses the implementation of the biological goals and objectives.

An NCCP must include both a monitoring program and an adaptive management program (California Fish and Game Code Section 2820[7] and [8]). An NCCP also must integrate adaptive management strategies that are periodically reviewed and modified on the basis of the results of monitoring efforts and other sources of new information (California Fish and Game Code Section 2820[a][2]).

The monitoring and adaptive management program described in this chapter is intended to fulfill HCP and NCCP requirements to monitor covered species, natural communities, and species response to management activities. This program will continually incorporate recommendations for monitoring and adaptive management based on the most recent guidelines provided by the USGS Biological Resources Division, CDFG, and USFWS for regional HCPs and NCCPs (Atkinson et al. 2004).

7.1.2 Adaptive Management

Adaptive Management is a decision-making process promoting flexible management such that actions can be adjusted as uncertainties become better understood or as conditions change (**Figure 7-2**). Monitoring the outcomes of management is the foundation of an adaptive approach, and thoughtful monitoring can both advance scientific understanding and modify management actions iteratively (Williams et al. 2007).

Adaptive management is necessary because of the degree of uncertainty and natural variability associated with ecosystems and their responses to management. Based on the best scientific information currently available, it is expected that the Plan's conservation actions will effectively implement the conservation strategy described in Chapter 5. However, there are varying degrees of uncertainty associated with the management techniques and conditions within and outside the study area. In addition, the status of covered species and natural communities may change in unexpected ways during Plan implementation. It is possible that additional and different management measures not identified in the Plan will be identified in the future and proven to be more effective in implementing the conservation strategy described in Chapter 5 than those currently implemented. Results of effectiveness monitoring may also indicate that some management measures are less effective than anticipated. To address these uncertainties, an adaptive approach will be used to inform management; the monitoring program will be designed to support this adaptive approach.

The cornerstone of the monitoring and adaptive management program is an experimental approach in which monitoring will yield scientifically valid results that inform management decisions (**Figure 7-3**). Information collected through

monitoring and other experiments will be used to manage reserve lands and protect covered and other native species habitat and natural communities. The adaptive management process will be administered by the Implementing Entity. The Implementing Entity will also coordinate and share the results of monitoring and targeted studies, as appropriate, with other regional restoration and management programs and among the Local Partners and the Wildlife Agencies. A well-coordinated and scalable monitoring program will enable the Implementing Entity and others to measure and evaluate change in resources and threats within individual reserves, across the entire study area, and throughout the ecoregion. Such coordination requires standardization of protocols, sampling design, and training of personnel, as well as integrative data analysis.

Another important component of the adaptive management process is outside review by scientists. Science advisors (see Section 7.2.3 *Program Implementation* subheading *Program Infrastructure*) will evaluate the effectiveness of existing or proposed management actions. The Implementing Entity will incorporate recommendations provided by these reviews, where appropriate, into Plan implementation. It is also intended that the adaptive management program will provide the basis for budget and funding decisions throughout the term of the Plan and in accordance with active adaptive management principles (see **Figure 7-4**).

Integrating adaptive management and monitoring is critical to the successful implementation of the conservation strategy. Monitoring is the foundation of an adaptive approach, and adaptive management actions are developed, in part, from the results of monitoring. In this Plan, the two components are integrated into a single program.

The monitoring and adaptive management program will inform reserve managers and other decision makers of the status of covered and other native species, natural communities, and essential ecological processes such that management actions can be revised when necessary to meet the biological goals of the Plan. The effectiveness of conservation efforts will be evaluated following the model outlined in **Figure 7-4**. This figure illustrates how indicators and success criteria will be developed and how monitoring will be used to ensure the effectiveness of the Plan. The use of conceptual ecological models will also guide monitoring and adaptive management (see **Figure 7-5**). Conceptual models will help frame questions for monitoring, and results will help guide future management and monitoring efforts while simultaneously updating the models (see **Figures 7-6** and **7-7**). Using monitoring to provide information for adaptive management actions will require a framework for measuring responses (**Figure 7-3**). In its simplest form, monitoring that happens immediately after management actions occur will inform future efforts. However, as **Figure 7-3** illustrates, management actions must be developed in concert with monitoring objectives such that increased certainty regarding the significance of the results can be obtained. Pilot projects will be carried out (see Section 7.2.1 *Types of Monitoring* subheading *Targeted Studies*, below), whereby management actions will be treated as experiments, and monitoring will be used to evaluate each action. This will allow management to proceed without complete knowledge of the needs of

the species or ecological processes. All of these components are described more fully in the following sections.

In summary, adaptive management is the land manager's response to new information. Adaptive management actions will likely take place at the following junctures:

a) In response to the results of targeted studies including pilot projects,

b) In response to downward trends in the status of covered species or key natural-community variables,

c) When new information from the literature or other relevant research indicates that a feasible and superior alternative method for achieving the biological goals and objectives exists,

d) When monitoring indicates that the expected or desired result of a management action did not take place, and

e) Proactively, when threats are identified through the ongoing development of conceptual models (see **Appendix J**, Section J.2.2 *Natural Community Monitoring Tools* and **Figures 7-6 through 7-9**) or through other monitoring efforts in the study area. An example of an adaptive management action resulting from a pilot project is the decision to use deer exclusion fencing rather than willow planting in target stream reaches to achieve stream restoration based on the empirical results of the study.

Most adaptive management measures will occur when conservation actions do not produce the desired outcome or when species /natural-community trends decrease. In these cases, new actions would be implemented to try and improve the outcome for species and communities. Such actions include but are not limited to the following:

- Alter the timing, location, intensity or type of grazing;
- Reduce, increase or otherwise change the pattern of prescribed burning;
- Change the flow regime released from reservoirs into target streams (e.g., timing, frequency, magnitude of flow levels or events);
- Re-evaluate and, if necessary, alter avoidance and minimization measures;
- Modify age, timing, location, or type of seedling transplantation for natural-community restoration;
- Prioritize or de-emphasize one aspect of noxious weed control such as targeted pesticide use;
- Increase, decrease or desist species-specific conservation actions such as translocation of individuals based on experimental results.

Any of the conservation actions proposed in **Tables 5-1a–d** can be modified in response to new information following the principles of adaptive management.

7.1.3 Program Objectives

The overarching objective of the monitoring and adaptive management program is to ensure that the conservation strategy described in Chapter 5 and the biological goals and objectives (**Tables 5-1a–d**) are being achieved. This chapter presents a foundation for accomplishing this task. The reserve unit management plans, which will include monitoring and adaptive management components, will be submitted to the Wildlife Agencies for review and approval within 5 years of the acquisition of the first parcel of each reserve unit. Additional objectives of the monitoring and adaptive management program are listed below.

- Provide an organizational framework and decision-making process for evaluating monitoring, targeted studies, and other data to adjust management actions.
- Document the baseline condition of biological resources in the Reserve System and other key habitat outside of the Reserve System using existing data, modeling, and the results of ongoing field surveys.
- Develop conceptual models for natural communities and covered species, if applicable, that can be used as the basis for collecting information, verifying hypotheses, and designing and changing management practices (see **Appendix J**, Section J.2.2 *Natural Community Monitoring Tools* and **Figures 7-6 through 7-9**).
- Incorporate hypothesis testing and experimental management, including targeted studies to address key uncertainties and to improve management and monitoring efforts.
- Develop and implement scientifically valid monitoring protocols at multiple levels to ensure that data collected will inform management and integrate with other monitoring efforts.
- Ensure that monitoring data are collected, analyzed, stored, and organized so the data are accessible to the Implementing Entity, the Permittees, regulatory agencies, scientists and, as appropriate, the public.

7.1.4 Program Scope

Designing a biological monitoring and adaptive management program that is logistically feasible and scientifically sound is a complicated task that will take many years. This chapter provides a framework, guidelines, and specific recommendations that will help the Implementing Entity develop a detailed monitoring component for their reserve unit management plans. Before each reserve unit management plan monitoring component is developed, basic monitoring will be initiated within the Reserve System. Upon permit approval, the Implementing Entity will compile information from ongoing monitoring efforts conducted by the Permittees throughout the study area.

Monitoring priorities will be guided by the species groupings (described in detail below in Section 7.3.3 *Species-level Actions*). Species have been categorized

into three groups on the basis of listing status and portion of range in the study area. Group 1 includes most of the covered species currently listed as endangered or threatened and covered species for which the study area constitutes a critical portion of the species' range.

Conceptual models will be developed for Group 1 species, and baseline surveys will be initiated for newly acquired parcels. If restoration actions are proposed before the reserve unit management plan is in place, a design plan, including experimental design, monitoring actions and adaptive management will be developed, specific to that action. **Table 7-1** provides a summary of monitoring tasks throughout the Plan permit and beyond. Detailed information of monitoring tasks by program phase is found in Section 7.2.2 *Program Phases*.

It is beyond the scope of this Plan to develop a comprehensive monitoring program at this time. Rather, the goal of this chapter is to provide sufficient guidance to ensure that the monitoring program designed during implementation will meet regulatory standards. Because the location and condition of the Reserve System as well as all target areas for monitoring outside the Reserve System are not known at this time, it would be difficult or impossible to develop detailed monitoring requirements including protocols, thresholds, triggers, and other key variables. Furthermore, some of the components of this monitoring program will be new and will therefore require extensive field testing (see Section 7.2.1 *Types of Monitoring* subheading *Targeted Studies*, below) before they can be implemented on a large scale.

This approach of providing a framework, guidelines, and specific recommendations in the Plan is consistent with the monitoring and adaptive management plans for recent, approved regional HCPs and NCCPs including the Western Riverside County Multi-Species Conservation Plan (an HCP/NCCP), Coachella Valley HCP/NCCP, and East Contra Costa County HCP/NCCP. In earlier plans (e.g., the San Diego County Multi-Species Conservation Plan) that promulgated extensive details of the monitoring protocols and standards, it was found early in implementation that many of the protocols were infeasible or did not produce the right data to evaluate Plan success (B. Johnson pers. comm.).

The scope of the monitoring and adaptive management program is limited by the assurances provided by the Wildlife Agencies to the Permittees and described in Chapter 10. These assurances include the commitment by the Wildlife Agencies that if unforeseen circumstances arise (as defined in Chapter 10), the Permittees will not be required to provide additional land, water, or financial compensation beyond the obligations of the HCP/NCCP.

Despite the assurances provided by the Wildlife Agencies, the monitoring program is designed to be flexible. Because the Plan seeks to balance the requirements of management with the need to learn more about the ecological system through monitoring, the amount of funding allocated to monitoring can vary during the permit term. Funding can be shifted within the Plan at the discretion of the Implementing Entity to respond to the changing needs of the monitoring and adaptive management program. The scope of the monitoring and adaptive management program is further defined below.

Geography

The geographic scope of the monitoring and adaptive management program will be determined by the lands acquired and/or managed for the Reserve System and the streams managed for the conservation benefit of covered species as described in Chapter 5. Because lands for the Reserve System will be assembled over the course of the permit, the exact configuration of the Reserve System is unknown. However, the general locations of acquisition priorities have been defined (**Figure 5-8**). As the Reserve System grows, the monitoring program will also grow. Monitoring of streams and select covered species[3] will occur within and outside the geographic border of the Reserve System. The regional and global context of species and natural communities will be considered when designing and implementing monitoring and adaptive management.

Levels

Because the conservation strategy functions at multiple levels, the monitoring and adaptive management program must collect information at these multiple levels. The program described in this chapter details the framework for a three-tiered approach that consists of landscape-, natural community-, and species-level monitoring.

Landscape-level monitoring is designed to detect large-scale changes, such as changes in ecosystem processes, shifts in natural community distribution, and the integrity of landscape linkages. Community-level monitoring is designed to detect changes in the composition and function of natural communities, populations of key predator or prey populations, invasive species, and other important habitat factors for covered species. Species-level monitoring measures the effects of management actions on covered species and tracks the abundance, distribution, and other variables of covered species in the Reserve System and the study area. Additional detail on monitoring over these three levels is provided in **Appendix J** *Monitoring Issues and Tools.*

Coordination with Other Programs

Monitoring already occurs throughout the study area to varying degrees on public and private lands. Long-term monitoring and scientific experiments are conducted at several sites along Coyote Ridge for Bay checkerspot butterfly and many serpentine plants. The Plan's monitoring program will borrow from these existing programs where appropriate. During the inventory phase, the Implementing Entity will consult with the proponents of these monitoring programs to learn the latest protocols and determine what aspects of their monitoring overlap with the Plan's requirements. There may also be opportunities to conduct joint monitoring efforts to meet the needs of both

[3] Burrowing owl and tricolored blackbird. See species-specific monitoring discussion later in this chapter.

projects. Monitoring programs relevant to the Plan are referenced throughout this chapter, as appropriate.

The Implementing Entity will also coordinate and share monitoring and other experimental results with other regional restoration and management programs. A well-coordinated and scalable monitoring program design will enable the Implementing Entity and others to measure and evaluate change in resources and threats in individual reserves, across the entire Plan area, and within the ecoregion. Such coordination requires standardization of protocols, sampling design, and training of personnel, as well as integrative data analyses. Some of the programs and organizations with which the Implementing Entity will coordinate are listed below.

- Pacific Gas and Electric Company Bay Area Operations and Maintenance HCP (in progress).
- San Francisco Public Utilities Commission Alameda Watershed HCP (in progress).
- Proposed Three Creeks HCP (in progress).
- Upland Habitat Goals Project (Bay Area-wide).
- East Alameda County Conservation Strategy.
- Stream and biological monitoring conducted by SCVWD.
- Management and monitoring carried out by the Santa Clara County Parks.
- Bird monitoring conducted by the San Francisco Bay Bird Observatory in Santa Clara County.
- Other species monitoring conducted by local organizations such as the Burrowing Owl Consortium, California Native Plant Society, and local Audubon chapters.
- Post-fire recovery monitoring conducted at Henry W. Coe State Park (beginning in 2008).
- Management and monitoring programs conducted by adjacent land management agencies such as the Midpeninsula Regional Open Space District, Peninsula Open Space Trust, East Bay Regional Park District, Don Edwards San Francisco Bay National Wildlife Refuge, California State Parks in Santa Cruz County, and others.
- Long-term monitoring along Coyote Ridge for Bay checkerspot butterfly populations and several covered plant species.
- Future recovery planning efforts by CDFG and USFWS.

In addition, the proposed Three Creeks HCP monitoring and adaptive management program is being developed and will coordinate with the Habitat Plan regarding monitoring tasks for covered species common to the two plans. SCVWD will be responsible for the monitoring identified within the Three Creeks HCP and will coordinate its efforts with the Habitat Plan. The Implementing Entity may contract with SCVWD to undertake additional

monitoring related to the obligations of the Habitat Plan. Agreements for monitoring will be sought between SCVWD and the Implementing Entity once the Implementing Entity is established and the permits for both plans are issued.

7.1.5 Take Authorization during Monitoring

Some monitoring activities may require handling or disturbing state or federally listed species; such activities constitute take. The monitoring method is optimal when both the quality of information and the impact on the species is assessed. The monitoring program will consider the impact on the species, particularly in cases of very low population numbers. Take of covered species during monitoring activities is authorized providing that all of the following conditions are met.

- The take occurs in association with activities described in the conservation strategy, monitoring chapter, or reserve unit management plan approved by the Wildlife Agencies.
- The take occurs in the permit area, during the permit term, for activities conducted by the Permittees, the Implementing Entity, or any person acting under the direct guidance or authority of these entities.
- The person(s) undertaking such activities is qualified to do so and can carry out their duties in conformance with the protocols and procedures specified in the monitoring chapter and the reserve unit management plan (see Section 6.8.5 *Item 5: Results of Applicable Species Surveys and Monitoring* subheading *Qualified Biologists*).
- The activity is consistent with the Plan's monitoring and adaptive management program.

In order to meet federal and state requirements, the amount and extent of take must be reported in accordance with the permits. The occurrence of all special status species within the Reserve System will be reported to the CNDDB.

Simple surveys, such as habitat assessments, that would not result in take will likely be conducted by the biologists within the Implementing Entity. However, more complex biological field work, (e.g., kit-fox surveys, burrowing owl exclusions) may result in take and therefore must be carried out by a "qualified" biologist as defined in Section 6.8.5 *Item 5: Results of Applicable Species Surveys and Monitoring*.

7.2 Overview

7.2.1 Types of Monitoring

Recent guidance for regional conservation planning defines monitoring as the "systematic and usually repetitive collection of information typically used to

track the status of a variable or system" (Atkinson et al. 2004). Because this Plan monitors resources at three levels, many different variables are tracked. In addition to the levels of scale (i.e., landscape, community, and species), three main types of monitoring are specified: compliance monitoring, effectiveness monitoring, and targeted studies. A description of each of these types is provided below.

Compliance Monitoring

Compliance monitoring tracks the status of Plan implementation and documents that all requirements of the Plan are being met. Compliance monitoring verifies that the permittees are carrying out the terms of the HCP/NCCP, permits, and Implementation Agreement. It is also known as implementation monitoring. The Implementing Entity will track and ensure compliance monitoring internally and provide results to the Wildlife Agencies who will ensure that the Permittees remain in compliance with the permits, IA, and Plan. As defined by this Plan, compliance monitoring will comprise the components listed below.

- Tracking impacts on land cover types (**Tables 4-2 and 4-3**) and covered species modeled habitat (**Table 4-4**) to ensure impact limits are not exceeded and to ensure compliance with the Stay-Ahead requirements. This includes the time commitments for restoration/creation not tied to impacts (see **Table 5-14**) and time commitments for other conservation actions (see Chapter 5).
- Tracking the loss of occurrences of covered plants to ensure that impacts do not exceed the level authorized under permits (see **Table 4-6** for impact limits) and ensuring that equivalent or healthier plant occurrences are protected in the Reserve System (see Chapter 5).
- Tracking impacts to critical habitat for the bay checkerspot butterfly, California tiger salamander, and California red-legged frog (**Table 4-9**).
- Tracking habitat enhancement, restoration, and creation actions (**Tables 5-13, 5-16,** and **5-21**).
- Tracking implementation of acquisition requirements (**Tables 5-11, 5-13, 5-16, 5-19,** and **5-21**).
- Tracking implementation of management agreements for western burrowing owl nesting habitat (number of acres under management).
- Tracking implementation of other conservation actions on and off the Reserve System.
- Tracking implementation of avoidance and minimization requirements (see Chapter 6).
- Tracking and reporting of management and monitoring activities (Atkinson et al. 2004).

Effectiveness Monitoring

Effectiveness monitoring assesses the biological success of the Plan—specifically, it evaluates the implementation and success of the conservation strategy described in Chapter 5. Effectiveness monitoring includes monitoring the effects of management activities. An important component of this monitoring is determining patterns within the Reserve System relative to the baseline status and trends of biological resources. The Implementing Entity will design, conduct and report on the results of effectiveness monitoring. Wildlife Agencies, Science advisors and an Independent Conservation Assessment Team will have an opportunity to provide input on and evaluate the proposed effectiveness monitoring and its results (see Section 7.2.3 *Program Implementation*). Both status and trends monitoring and effects monitoring are described below.

Status and Trends

Indicators of the status and trends of biological resources are monitored to provide baseline data regarding the increase or decrease of these resources in the study area. Baseline data provides a temporal snapshot of the status of natural resources at the first year of monitoring and is a metric against which to compare future data. Status and trends monitoring will include quantitative data on covered species (population size, distribution), land cover, and modeled habitat as well as nonnative invasive species and other known threats. Additionally, historical data on population size or distribution can be relevant to understanding the current condition. For species or natural communities that go through natural fluctuations or variations, historical trends are more important than single year surveys. Qualitative assessments of vegetative structure and/or habitat quality will also be a component of status and trends monitoring. Examples of status and trends monitoring include quantitative data on covered species numbers, acres of land cover types in the study area, occurrences of invasive plant populations, and incidences of natural disturbance (e.g., fire, flood).

Effects of Management

Understanding the effects of management actions is a critical component of the monitoring and adaptive management program. The purpose of effects monitoring is to ascertain the success of management in achieving desired outcomes, to provide information and mechanisms for altering management if necessary, and to evaluate whether the conservation strategy described in Chapter 5 was successful.

The preliminary or initial component of effects monitoring will include the development and assessment of success criteria for management actions such as stream restoration, pond creation, and butterfly relocation. Where they exist, the biological goals and objectives will determine the form that success criteria take. Once success criteria are developed, effects monitoring will include monitoring these criteria as well as assessing the effects of management on covered species.

Finally, the effects of threat-abatement activities (e.g., density of nonnative invasive plants) will be evaluated (Atkinson et al. 2004).

To determine the effects of management, management actions will be conducted using an experimental approach when feasible (**Figure 7-3**).

Targeted Studies

Targeted studies fulfill three major objectives:

1. Identify the best methodologies for monitoring;
2. Provide information about the efficacy of management techniques; and
3. Resolve critical uncertainties allowing for improved management of systems and species.

For the purposes of this Plan, targeted studies that provide information regarding monitoring protocols are called *methods testing.* Targeted studies that provide information regarding the effects of management actions are called *pilot projects*. Targeted studies that address critical uncertainties are called *directed studies*. Methods testing and pilot projects will be conducted by the Implementing Entity or its contractors. Directed Studies could be carried out or funded by the Implementing Entity. However, the Implementing Entity may also utilize graduate students, University researchers, or other scientists whose project goals inform critical uncertainties and further the biological goals and objectives of the Plan. In addition, directed studies may be funded by outside sources if the work carried out on Reserve Lands furthers the Implementing Entity's understanding of covered species and natural communities.

Method Testing

Method testing is designed to evaluate alternative monitoring protocols and sampling designs and to select the best technique for obtaining information. For example, if the objective is to quantify wildlife use of a corridor crossing, methods testing might compare the use of tracking plates, bait stations, and trail cameras. The results of method testing would then be used to develop a long-term monitoring protocol.

Pilot Projects

Pilot projects will be used during implementation to ascertain, on a small scale, which management actions may ultimately yield the desired conservation gains prior to initiating a long-term project. Pilot projects are also a cost-effective way to test management actions. Pilot projects can and should be used during the early phases of Plan implementation to field test different management actions (see **Figure 7-3** for a continuum of experimental management).

Directed Studies

The term *critical uncertainties* refers to key questions that shape how the ecological system is actively managed. Because natural systems are extremely complex and dynamic, varying degrees of uncertainty are associated with conserving and managing these systems. Typically, management proceeds absent a full understanding of the components that affect a natural community or a species. The outcome of these management actions are carefully monitored and refined in acknowledgement of the high level of uncertainty. Directed studies are used to reduce the levels of uncertainty related to achieving biological goals and objectives. These uncertainties are generally related to the factors listed below:

- The ecological requirements of covered species, and
- The likely response of covered species and natural communities to implementation of conservation actions within the Reserve System.

All of the conservation actions identified as "STUDIES" in **Tables 5-2a–b** are considered directed studies. The Implementing Entity may propose additional directed studies not identified as conservation actions. Directed studies will be carried out to gain insights into key questions identified in the conservation strategy and during Plan implementation. All proposed directed studies will be prioritized during implementation and will be carried out based on their priority ranking. Directed studies identified in **Table 5-2b** will be prioritized and funded as part of conservation strategy implementation.

Results of directed studies conducted under the Plan will inform management and ensure attainment of the biological goals and objectives. It is expected that some or all of the directed studies specifically outlined in the conservation strategy will be conducted by the Implementing Entity or consulting scientists. Additional long-term directed studies, identified during Plan implementation, will be conducted by or in partnership with outside scientists from academic institutions, consulting firms, and nonprofit organizations. It is anticipated that funding provided by the Implementing Entity for directed studies could be matched or supplemented by other entities to increase the level of investigation and to achieve results that integrate with broader issues in the scientific community. In addition to the directed studies undertaken to answer critical uncertainties, it is expected that the Implementing Entity will develop partnerships with academic institutions (e.g., undergraduate student projects, Masters theses, Ph.D. dissertations) to help address broader scientific interests within the Reserve System that will nonetheless inform and improve management and monitoring techniques. Funding for this and other programs is described in more detail in Chapter 9 *Costs and Funding*.

7.2.2 Program Phases

The essential elements of the monitoring and adaptive management program have been organized into three main phases: inventory, targeted studies, and long-term monitoring and adaptive management.

Key tasks in each phase are described in below. In general, activities in the inventory phase will occur during the first 5 years of Plan implementation and thereafter as parcels are added to the Reserve System. For individual sites, the inventory phase will begin immediately after land acquisition. Most targeted studies will be concentrated in the first 5 years of Plan implementation, but they will likely continue throughout implementation as management uncertainties are identified and resolved. Activities in the long-term monitoring phase will begin on each site after the inventory phase is complete. Because the Reserve System is being created over several decades there will likely be extensive overlap between activities in each phase during the first 10–20 years of Plan implementation (**Figure 7-1**). Also, see **Table 7-1** for a summary of monitoring tasks throughout the permit term.

Inventory Phase

The initial inventory phase of monitoring occurs following permit approval and continues as new parcels are acquired and added to the Reserve System or new conservation actions are initiated outside the Reserve System, primarily on streams. Baseline information collected during the inventory phase will lay the foundation of the overarching monitoring and adaptive management program. Inventories will need to occur over multiple seasons to ensure that all species present are identified. If a parcel is acquired in a drought, it may take several years for certain plants to appear, for example. Under normal conditions, the initial inventory will take place within 3 years of acquisitions for each site. The Implementing Entity will inventory and assess landscapes, natural communities, and species, as appropriate, within the Reserve System. This information will build largely on the data collected during pre-acquisition assessments and will be supplemented by post-acquisition monitoring.

In addition to the acquisition of baseline information, the inventory phase will focus on the identification of key relationships between species, habitats, and processes; the prioritization of project implementation; the refinement of species groups; and the selection of biotic and abiotic indicators for evaluating ecosystem condition. Information collected during the inventory phase will build on species information (**Appendix D**) as well as other data sources (e.g., historical ecology reports).

Document Baseline Conditions

Baseline conditions within the Reserve System need to be documented to enable management planning and to serve as a comparison point for all future

monitoring. Accordingly, resources of interest that occur on a site need to be documented, mapped and, if required to measure compliance with biological goals and objectives, censused. Also, baseline surveys and post-construction monitoring will take place in areas where activities may impact a covered plant occurrence. Documenting baseline conditions will consist of the following tasks.

- Update GIS land cover layer with aerial photographs, satellite imagery, and other relevant data sources including serpentine soils maps at the outset of implementation.
- Inventory and document resources and improve mapping as the Reserve System is assembled. The results of the assessments for land acquisition (i.e., pre-acquisition assessment; see Chapters 5 and 8) will be the first source of baseline data. Data-collection methodologies and nomenclature will be standardized to facilitate sharing of information.
- Conduct baseline surveys for plants in areas where covered activities may impact plant occurrences (Condition 20).
- Research and document historical data and trends, as appropriate.
- Use baseline data to validate and refine species habitat models as lands are surveyed and acquired (species models will be updated periodically, but no less frequent than every 5 years, consistent with new survey data collected from the Implementing Entity, from land cover mapping provided by project applicants, and from other relevant sources).
- Conduct post-acquisition biological inventories. Additional surveys will be needed to supplement data gathered in pre-acquisition assessments.
- Conduct post-construction surveys for covered plants in areas where covered activities may have impacted occurrences of covered plants (Condition 20).
- Use aerial photos and ground surveys, as needed, to assess quality and location of local and regional landscape linkages between unprotected natural areas and adjacent protected lands.
- Collect additional baseline data needed to refine conceptual models (see **Appendix J**, Section J.2.2 *Natural Community Monitoring Tools* and **Figures 7-6 through 7-9**).

Initiate Management Planning

Management planning will consist of the following tasks.

- Prioritize implementation of conservation actions to best achieve biological objectives.
- Develop reserve unit management plans (described in Chapter 5, Section 5.2.5 *Land Management*).
- Confirm species monitoring groups and refine the monitoring schedule.
- Identify biotic and abiotic indicators (see section on indicators for description) for testing during the targeted studies phase.

- Select monitoring protocols and identify sampling design for status and trends and effects monitoring. Test experimental designs during the targeted studies phase, as necessary.
- Develop criteria for measuring success of enhancement, restoration, and creation efforts (see example criteria in **Table 7-2**).
- Develop criteria to assess effectiveness of conditions on covered activities (described in Chapter 6 *Conditions on Covered Activities and Application Process*).

Upon implementation of the Plan, the Implementing Entity will document baseline conditions along with survey methods and monitoring schedules based on the guidelines for monitoring described below. Some species have boom/bust population dynamics that are highly dependent upon weather (e.g., Bay checkerspot butterfly and some of the covered plants). Survey protocols and the success criteria developed will account for this. These protocols and schedules will provide the overarching framework that will be implemented in each management unit. The Implementing Entity will draw from relevant and established protocols (e.g., Wildlife Agency and CNPS survey protocols) and will adapt them throughout the permit term to incorporate the best available scientific data.

A monitoring component will be developed for each reserve unit management plan that identifies protocols, indicators, monitoring schedule, and success criteria. This component will be revised to include information from methods testing, pilot projects and directed studies as results become available. Before the reserve unit management plan for a given reserve is complete, monitoring on lands in the Reserve System will consist of baseline inventories, pilot projects to test monitoring methods, and directed studies.

Targeted Studies Phase

The targeted studies phase of monitoring also follows permit approval and will continue as long as critical uncertainties persist (**Figure 7-1**). However, most targeted studies will take place within the first 5–10 years of Plan implementation such that results can inform long-term management. The Implementing Entity will develop conceptual models for key natural communities (see **Figure 7-8**) and covered species (see **Figure 7-9**) that identify critical management uncertainties; design and initiate pilot projects to test management and monitoring methods; develop and initiate experiments that resolve critical uncertainties; and begin pretreatment monitoring of sites considered for enhancement, restoration, or creation.

Develop Ecological Models

Management-oriented conceptual ecological models will be a cornerstone of the monitoring program and will be created during the initial years of

implementation. These models will inform the monitoring program by identifying relationships between ecosystem components and by identifying management assumptions. As the monitoring program collects additional data, these "living" models will serve as a framework for management decisions and will function as reference points for the Implementing Entity's understanding of the relationship between management and natural communities and/or covered species within the Reserve System. In addition, species conceptual models that identify threats, management and monitoring for species will be developed. A full description of conceptual ecological models and species conceptual models is found in **Appendix J**, Sections J.2.2 *Natural Community Monitoring Tools* and J.3.1 *Species-Specific Monitoring Tools* respectively.

Test and Refine Monitoring Protocols

In the targeted studies phase, the Implementing Entity will conduct methods testing (described above) to develop, test, and refine monitoring protocols. Monitoring protocols will be developed for landscapes, natural communities, species groups, and individual covered species. The purpose of this testing is to identify the best and most cost-effective monitoring methodologies to derive the desired information. For example, one of the biological objectives of the conservation strategy is to increase the permeability of certain barriers, such as highways, in the study areas. Monitoring will need to assess wildlife movement in target areas. The targeted studies phase will test methods (e.g., camera traps, track plates, use of bait) to determine the desired protocols for long-term monitoring. Monitoring protocols will be conducted in a repeatable manner and will provide both quantitative and qualitative data to inform management design within the Reserve System.

In some cases there is little distinction between pilot projects and long-term monitoring. During the targeted studies phase, different management techniques will be implemented and evaluated experimentally. In some cases, restoration, enhancement, and monitoring methods are not known or have not been successfully reproduced on a large scale by land managers or the scientific community. Before restoration or enhancement through management can occur successfully, these methodologies need to be tested on a smaller scale. These pilot projects, designed to test the effectiveness of restoration and enhancement, are necessarily long-term (i.e., 5–15 year) endeavors; they will inform long-term management but will also be included as part of the long-term management program. Results from these early studies will guide future efforts in the Reserve System. This feedback will increase the efficiency with which reserve lands can be managed and the overall success rate of management activities. For example, a study published in 2004 evaluated the effectiveness of methodologies for restoring riparian vegetation (Opperman and Merelender 2004). Similar pilot projects will be developed in the targeted studies phase when multiple techniques are intended to achieve a desired outcome and are appropriate for monitoring habitat function within the Reserve System and overall study area.

Testing the use of indicators for natural communities or covered species; refining monitoring protocols; establishing control plots for long-term management; and

reviewing the literature for guidance on sampling, experimental design, and management will all be a part of the targeted studies phase of implementation.

Develop Experiments to Resolve Critical Uncertainties

A final element of the targeted studies phase of implementation is the development of experiments that resolve critical uncertainties. In some cases, critical uncertainties will be identified as conceptual models are developed (see **Appendix J**, Section J.2.2, *Natural Community Monitoring Tools*, **Appendix J**, Section J.3.1, *Species-Specific Monitoring Tools*, and **Figures 7-6 through 7-9**). In other cases, critical uncertainties have been identified and described as part of the biological objectives of the Plan (see especially the Directed Studies section of **Table 5-2b**). For example, in order to enhance the chaparral land cover types, the critical uncertainty of factors contributing to the health and regeneration of native chaparral species must be resolved. The targeted studies phase of implementation will entail initiation of projects that resolve the critical uncertainties identified in the Directed Studies section of **Table 5-2b** as well as any other critical uncertainties identified as the conceptual models are developed.

In addition, the Implementing Entity will work with other individuals and organizations (e.g., local universities) to facilitate targeted studies on the Reserve System and streams that will improve management.

Long-Term Monitoring and Adaptive Management Phase

Both the inventory phase and the targeted studies phase will be followed by long-term monitoring to determine the status and trends of landscapes, natural communities, and species and the effectiveness of the management of the Reserve System in achieving the biological goals of the Plan (**Figure 7-1**). Monitoring that does not depend on the results of targeted studies will occur as soon as the reserve unit management plans have been reviewed and approved by the Wildlife Agencies and baseline studies are complete (inventory phase) or sooner, if appropriate. Long-term monitoring will use the framework developed during the inventory phases to carry out effectiveness monitoring and to implement adaptive management.

The long-term monitoring phase includes the following tasks.

- Update GIS land cover layer with aerial photographs, satellite imagery, and other relevant data sources including serpentine soils at least every 5 years. Assess status and trends at the landscape and natural community levels.
- Monitor species (covered species or indicator species) response to enhancement, restoration, and habitat creation.

- Monitor restoration sites for success; remediate sites if initial success criteria are not being met. The reserve unit management plan will identify triggers for remediation, if necessary.
- Monitor covered species using methodologies developed in targeted studies phase. Assess status and trends of covered species by monitoring covered species populations, groups, or guilds of species or indicators over time.
- Assess status and trends of covered plants that may have been partially or temporarily impacted by covered activities to ensure that plant protection in the Reserve System adequately offsets impacts.
- When enhancement and restoration projects are complete and have met final success criteria, scale back monitoring effort (i.e., frequency, extent) but continue to adaptively manage these sites[4].
- Update **Figure 2-5** *Private Development Areas Subject to the Plan* based on best available science throughout implementation to ensure projects in specific portions of the permit area are required to go through the Plan are appropriately identified. Revisions to the map will be tracked in the annual report.

In addition to long-term monitoring, this phase will include steps to adaptively manage the Reserve System to implement the conservation strategy described in Chapter 5. Adaptive management tasks are listed below.

- **Evaluate efficacy of monitoring protocols.** During this phase, the results of pilot projects will be evaluated and incorporated into long-term monitoring efforts.
- **Incorporate best available scientific information into management.** Regular reviews of literature as well as interaction with the Science advisors and the Wildlife Agencies will ensure that new understanding of the species or monitoring approaches is incorporated into the monitoring and adaptive management program.
- **Evaluate and refine conceptual models.** Conceptual models will be developed for each species and for natural communities (see **Appendix J**, Section J.2.2 *Natural Community Monitoring Tools*, **Appendix J**, Section J.3.1 *Species-Specific Monitoring Tools*, and **Figures 7-6 through 7-9**). In addition, the existing species habitat models developed for this Plan will be refined. As more information becomes available and as assumptions evolve, the models will reflect changes and continue to provide guidance for future monitoring efforts.
- **Review any unexpected or unfavorable results and test hypotheses to achieve desired outcome.** Unexpected results or results suggesting that the conservation actions will not likely meet the conservation strategy commitments described in Chapter 5 of the Plan will be probed to understand

[4] Frequencies of monitoring will be dependent on the natural community or species and will be determined during the development of the reserve unit management plans. In some cases, monitoring will be conducted on an annual basis, in other cases, monitoring may only be necessary every 3–5 years.

the cause or source of the result. Hypotheses about management outcomes will be tested.

- **Adjust management actions and monitor.**
- **Adjust success criteria and conservation actions, if necessary.** The success criteria and conservation actions developed for the Plan will be adjusted if they have been determined to be inappropriate indicators of success (too high or too low, based on biological information), if more cost-efficient but equally successful conservation actions are developed and agreed upon by the Wildlife Agencies, or if they are inadequately conserving species or communities. The magnitude of the change to the success criteria will be based on best available scientific information. New or different conservation actions may be implemented through time, as long as they fulfill the conservation strategy commitments described in Chapter 5 of this Plan. Conservation actions are catalogued in **Tables 5-1a–d and 5-2a–b** and are described in more detail in Section 7.3, *Monitoring and Management Actions*, below. Example success criteria are described in **Table 7-2**. Operational success criteria will be developed during the Targeted Studies phase of implementation. Changes to success criteria and conservation actions will be discussed with and not implemented until approved by the Wildlife Agencies. For significant changes, a permit amendment may be necessary.

7.2.3 Program Implementation

Program Infrastructure

As described above, adaptive management is a critical element of the Plan because it addresses many of the uncertainties of the Plan and provides for continual adjustment and improvement toward meeting Plan goals and objectives. Key to the success of the adaptive management program is a clear and effective structure for making decisions on the basis of new data from Plan monitoring and information from other sources. The Implementing Entity will be advised by five groups that play an important role in adaptive management:

- Wildlife Agencies,
- Other land management agencies (or a Technical Advisory Committee),
- Science advisors,
- Independent Conservation Assessment Team, and the
- Public.

As a preliminary planning step to coordination, the Implementing Entity will inventory monitoring projects and programs in the study area, their goals, timelines, design, protocols, etc. This will help coordinate information and will be an important first step in developing the monitoring component of the reserve

unit management plans. The Implementing Entity's responsibilities for executing the adaptive management program are listed below.

- Designing and implementing a scientifically robust effectiveness monitoring program (described above).
- Gathering monitoring and research data, including relevant information developed by others, and maintaining databases.
- Disseminating monitoring and research data generated by the Habitat Plan, including monitoring reports, conference presentations, and published papers to others.
- Assessing the effectiveness of conservation measures relative to the conservation strategy described in Chapter 5.
- Identifying the need to modify existing or to adopt additional conservation measures and defining what to change and how to change it.
- Identifying the need to modify the monitoring program and defining what to change and how to change it.
- Identifying the need for and implementing experimental pilot projects.
- Identifying and prioritizing targeted studies and conducting studies that inform critical uncertainties.
- Developing and updating the monitoring and adaptive management elements of reserve unit management plans.
- Incorporating monitoring, directed studies, and other adaptive management–related activities into reserve unit management plans.
- Creating and maintaining a network of science advisors (see below) to provide advice to the Implementing Entity, as needed, on adaptive management and monitoring issues including important data gaps, monitoring and management methods, and data interpretation.
- Periodically (at least every 5 years) convening the Independent Conservation Assessment Team (Section 7.2.3 *Program Implementation*) to conduct a program-wide review of Habitat Plan implementation, including monitoring and adaptive management, and providing recommendations to improve Habitat Plan implementation.
- In Year 20 of implementation, work with the Wildlife Agencies to conduct a formal and complete review of progress toward building the Reserve System.

The Implementing Entity will solicit input regarding adaptive management from the Wildlife Agencies, science advisors, Independent Conservation Assessment Team, other independent experts, and the public. In addition, the Implementing Entity may convene technical committees to seek focused advice on key adaptive management topics. The responsibility for which course of action to take in adaptive management rests with the Implementing Entity and its senior staff or senior contract biologists. However, the Wildlife Agencies will assist the Implementing Entity with the adaptive management program. Major shifts in the adaptive management program need to be reviewed and approved by the Wildlife

Agencies. Major shifts include, but are not limited to, proposed actions that may be inconsistent with the Plan or detrimental to a covered species, introducing new and untested management techniques, discontinuing and replacing ineffective management techniques that are recommended in the conservation strategy, or applying management techniques on a much larger or smaller scale than envisioned in the Plan. Decisions made in the adaptive management program will be based primarily on which course of action is most likely to meet the conservation strategy described in Chapter 5.

Wildlife Agencies

A primary role of the Wildlife Agencies is to provide feedback to the Implementing Entity regarding changes to Plan implementation based on the results of targeted studies and monitoring and on the recommendations of the science advisors, the Independent Conservation Assessment Team, academic scientist partners, and others. Where possible, Wildlife Agency staff will provide expertise in the biology and conservation of covered species and natural communities, management tools, monitoring program, and all other Plan implementation.

The Implementing Entity and the Wildlife Agencies will strive at all times to work in good faith with each other to reach mutual agreement on key implementation tasks such as adaptive management, monitoring, and conservation actions. The primary forum in which these discussions will occur is the Technical Advisory Committee described in Chapter 8, Section 8.2.4 *Technical Advisory Committee*. Additional meetings with the Wildlife Agencies may be needed to discuss and resolve key issues related to adaptive management and monitoring. If disagreements arise that cannot be resolved easily, the Implementing Entity will follow the "meet and confer" dispute resolution process outlined in Section 6.6.1 of the Implementing Agreement, and if necessary, the "elevation of dispute" process outlined in Section 6.6.3 of the Implementing Agreement (**Appendix B**).

Land Management Agencies

As discussed above, the Implementing Entity will share information and resources in implementing management across reserve boundaries and on a regional scale with other land management agencies in the study (e.g., County Parks, State Parks, and the Open Space Authority). Input from other land management agencies in the study area is an important component of successful adaptive management. Land management agencies that manage land on behalf of the Implementing Entity (i.e., as part of the Reserve System) will form a Technical Advisory Committee to coordinate management and ensure consistency across the Reserve System.

Science Advisors

The Implementing Entity will consult science advisors who will provide regular advice on Plan implementation. The role of the science advisors is to provide the Implementing Entity with science-based expert opinion and recommendations, focused "white papers," peer review, and feedback regarding key scientific aspects of Plan implementation such as reserve assembly, reserve management, and monitoring protocols. Science advisors will be contacted by the Implementing Entity and its partners, including the Wildlife Agencies, as needed. They may also be convened as a group when needed to address specific topics. Science advisors will be scientists and resource managers with expertise in one or more of the following areas:

- Covered species,
- Landscape ecology,
- Natural communities in the Reserve System,
- Ecological processes,
- Resource management,
- Biological monitoring,
- Statistical analysis and experimental design.
- Conceptual models,
- Species-specific surveys, and
- Species protocols.

Science advisors will be selected by the Implementing Entity with input from the Wildlife Agencies. The Implementing Entity may also request that the science advisors review the following types of information prepared by or for the Implementing Entity.

- Proposals for directed studies to address important management questions.
- Management and monitoring reports and recommendations to the Implementing Entity provided by others.
- Monitoring priorities, sampling design, survey protocols, data analysis, and data storage.
- Proposals for experimental pilot projects to test natural community enhancement/creation/restoration or management techniques.
- Proposed changes in reserve design and management, natural community enhancement/restoration/creation techniques, alternative conservation measures, and monitoring methods, based on interpretation of monitoring or research results and consistent with the protocols for, and limitations on, the Adaptive Management Program.

Independent Conservation Assessment Team

The Independent Conservation Assessment Team will be composed of highly qualified scientists and resource managers who are independent of the Habitat Plan and the science advisors. Selecting members who are independent of the Plan is important to ensure an unbiased assessment of Plan implementation. The role of the Independent Conservation Assessment Team is to provide periodic review of overall Habitat Plan implementation, including the following specific areas:

- Assembly of the Reserve System and the progress of habitat restoration efforts;
- The appropriateness of the monitoring and management methods being used to achieve Plan goals, including indicators and success criteria;
- The appropriateness of the interpretation of monitoring data; and
- Changes that may be needed in conservation, management, or monitoring to better achieve Plan goals.

The Independent Conservation Assessment Team will provide policy-level recommendations to the Implementing Entity. The Independent Conservation Assessment Team will be selected and convened by the Implementing Entity at least every 5 years as part of the 5-year major Plan review. The Wildlife Agencies will be consulted regarding prospective members. A 5-year interval will allow progress to be made toward Plan compliance and biological goals and objectives, as well as the collection of monitoring data sufficient to support a thorough and meaningful progress review. It is expected that the composition of the Board will change each period, although some consistency in membership is preferred. It is also expected that the scope of review of the Independent Conservation Assessment Team will vary each time they are convened. For example, the first time they meet their review will likely focus on the initial phases of implementation and early monitoring results and protocols. Later reviews will focus on more extensive monitoring data and results.

The Public

Members of the public will have opportunities to learn about Plan status and provide input to the Implementing Entity on adaptive management during periodic (at least annual) public hearings and regular meetings of the public advisory committee, which will be open to the public. Members of the public may offer important contributions to a successful adaptive management program, such as providing data on covered species, critical reviews of monitoring data, and suggestions for improved land management. Members of the public may also participate in data collection through a volunteer program supervised by the Implementing Entity or its designee.

7.2.4 Guidelines for Monitoring

Because the biological outcome of many management actions is uncertain, the monitoring and adaptive management program is based on scientific principles that guide continual refinement of conservation efforts in order to implement the conservation strategy described in Chapter 5. The adaptive management program will develop alternative management strategies and test the effectiveness of those strategies in the Reserve System. To that end, there is a continuum of management actions that incorporate scientific principles of adaptive management to varying degrees (**Figure 7-1**). The most basic monitoring involves simply assessing effects once a management action has occurred without any replication, controls, or comparison of management treatments. At the other end of the spectrum are directed studies that test a hypothesis in a manner that can be validated through statistical inference. Even simple experimental methods will yield important results to help guide and improve management. The scientific principles listed below will guide monitoring and adaptive management.

- Adaptive management actions will incorporate scientific principles of replication, control, and pre- and post-treatment monitoring when necessary to accurately measure the Plan's implementation of the conservation strategy. Targeted studies will refine monitoring protocols and resolve key management uncertainties.
- Adaptive management and monitoring actions will be linked to hypotheses about species' ecological relationships and responses to management actions. Monitoring will be designed in such a way as to test these hypotheses.
- When feasible, adaptive management or directed studies will include an experimental design with appropriate significance levels (alpha level) as well as sufficient statistical power to detect effects (beta level).

Adaptive management, and the design of targeted studies, will be driven by hypotheses about key factors for the landscape, natural community, and/or species for which the management is applied. For example, if the goal of management is to increase populations of small mammals to serve as a prey base for certain covered species (e.g., western burrowing owl, San Joaquin kit fox), land managers must develop hypotheses about what controls small mammal abundance and distribution. Adaptive management actions and monitoring will be directed toward confirming or disproving those hypotheses. Directed studies will be conducted on a small scale using an experimental design that will yield statistically valid results to address critical uncertainties. Ultimately, if small mammal availability limits the abundance of covered species, increasing the prey base may increase the survival and fitness of covered species. If the prey base increases and the covered species do not respond, then other factors apparently limit their abundance.

In addition to the scientific guidelines described above, the following steps will be included in the experimental design.

1. **Define the question.** Monitoring strategies will be designed to address specific hypotheses. Conceptual, statistical, or spatially explicit models will define those hypotheses. Conceptual models are described in **Appendix J**, Sections J.2.2 *Natural Community Monitoring Tools* and J.3.1 *Species-Specific Monitoring Tools.*
2. **Determine what to measure.** Establish the attributes or variables that the monitoring will measure to answer the question defined above. This step includes the development of measurable success criteria for evaluating creation, restoration and enhancement actions.
3. **Develop monitoring protocols.** Questions to be answered by the monitoring program will be at the species, natural community, and landscape level. Monitoring protocols will vary with level and with the target of the monitoring. Monitoring protocols will be developed in accordance with the guidelines provided below in Section 7.2.4 *Guidelines for Monitoring* subheading *Protocols*.
4. **Use indicator species, if appropriate.** In some cases, groups of species or indicator species will streamline monitoring. Indicators are selected because they are easy to survey and provide usable information on the species or system in question. Guidelines for selecting and using indicators are described in detail below.
5. **Consider sampling design.** Sampling design needs to be a consideration prior to initiating the experiment. The experimental management approach of the HCP/NCCP requires that questions of site selection, statistical power, and significance be incorporated, as much as possible, into the monitoring and adaptive management program. Sampling design is described in detail below.

In addition, **Appendix J** *Monitoring Issues and Tools* provides guidance on monitoring challenges relevant to landscape, natural community and species for the study area.

Indicators

Indicators can be used in many ways: to predict species richness (MacNally and Fleishman 2004), to estimate biodiversity (Kati et al. 2004; Chase et al. 2000), to assess levels of disturbance, or to provide targeted information on a system or species (Caro and O'Doherty 1999; Carignan and Villard 2004). Landres et al. (1988) define an indicator species as

> an organism whose characteristics are used as an index of attributes too difficult, inconvenient, or expensive to measure of other species or environmental conditions of interest.

In this Plan indicators will be used, when appropriate, to provide information on covered species and other components that are difficult to survey, and to provide information on natural community or ecosystem function. In some cases indicators will be used to determine the availability of habitat for a species. For

example, the presence of a California ground squirrel colony would be an indicator for available upland habitat for California tiger salamander if there is also breeding habitat within dispersal distance. In that circumstance, the expansion of ground squirrel colonies would then represent an increase in available habitat for California tiger salamanders. Measuring the increase in ground squirrel colony size is much easier than measuring the increase in use by California tiger salamanders. Additionally, when there are complex interactions among biotic and abiotic factors, modeling species responses or using abiotic factors as an indicator may not be appropriate. Monitoring aspects of the target species may be a more reliable and often easier "indicator" than abiotic factors (like temperature, substrate or turbidity). For the purposes of this Plan, indicators are abiotic and biotic variables that are selected to facilitate monitoring of systems or species that are otherwise difficult to examine.

In cases where an indicator is used to monitor an ecosystem or natural community (health indicator species), the conceptual models will be used to help identify an appropriate indicator species or variable. Draft performance indicators for natural community enhancement, restoration, and creation measures are presented in **Table 7-2**. Indicators, in general, are easy to monitor and demonstrate changes or trends that are quantifiable. Indicators need not be species, but may be ecological variables or structure-based characteristics such as diameter and age class of trees, interpatch distances between habitat, or key structural features of certain habitat types (e.g., snags or downed logs in forests, woody debris in rivers) (Noss 1999; Lindenmayer et al. 2000). Effective indicators (or variables) have some or all of the following characteristics (Carignan and Villard 2002; Atkinson et al. 2004).

- They are relevant to program goals and objectives and can be used to assess the program performance at the appropriate spatial and temporal levels.
- They are sensitive to changes in the ecosystem, providing early warning of response to environmental or management impacts.
- They indicate the cause of change, not just the existence of change.
- They provide a continuum of responses to a range of stressors such that the indicator will not quickly reach a minimum or maximum threshold.
- They have known statistical properties, with baseline data, references, or benchmarks available.
- They are technically feasible, easily understood, and cost effective to measure by all personnel involved in the monitoring.

The indicators or variables will be coordinated with existing programs and data sets that are complementary to, and consistent with, the conservation strategy of this Plan. Prior to adopting any indicator, field verification and fine tuning in the system of interest is necessary (Atkinson et al. 2004). Once monitoring variables have been selected, the following descriptions will be made (Atkinson et al. 2004 as adapted from Gibbs et al. 1999 and National Research Council 2000).

- "What" will be monitored.

- "Why" the monitoring is useful (i.e., the specific question the variable is designed to address).
- "When" will the variable be monitored and at what frequency.
- The conceptual ecological model underlying the selection of the monitoring variable.
- The geographical area where it will be monitored (e.g., transect locations, stream miles).
- The specific variable that will be measured and the protocol that will be used.
- The range of values the monitoring can produce and what these would mean.
- The expected response (as in response to management or outside pressures) and the magnitude of change expected.
- The time frame and spatial scale over which change is expected to be demonstrated.

The monitoring component of each reserve unit management plan will clearly present the rationale for using indicators. Indicators must be applicable and appropriate measures of the biological goals and objectives. For example, the monitoring component will specify why monitoring the presence of egg masses for covered amphibians is an appropriate indicator of population-based goals and objectives. In this example, the reserve unit management plans will justify that counting individual adults, larvae, and/or metamorphs is not the only or preferred way of monitoring for population status. The recommendation of the science advisors will also help guide the selection of indicators and the Implementing Entity will work with Wildlife Agencies to develop appropriate indicators. Finally, it is important to consider how the results will be interpreted and how they can be used to create change, if necessary.

Protocols

When available, scientifically accepted monitoring protocols that are compatible with measuring the success of the conservation strategy of this Plan will be adopted to facilitate data comparison with other studies. Monitoring protocols will be appropriate to the task, accurate, and as cost-effective as possible. Monitoring protocols will be standardized across the entire Reserve System and will be incorporated into all reserve unit management plans. To be successful, the monitoring protocols must be applied consistently by different observers and across monitoring cycles. Ongoing training by Implementing Entity staff or their contractors will be necessary to ensure this consistency. For example, the National Park Service's Inventory and Monitoring Program guidelines for monitoring protocols (Oakley et al. 2003) or the Bureau of Land Management's guidelines (Elzinga et al. 1998), in addition to other sources, can be used as references for developing monitoring protocols.

Monitoring protocols will vary by covered species. For species that are difficult to detect in the study area (e.g., San Joaquin kit fox), monitoring may be limited

to determining whether the species persists from sample period to sample period, what features define its habitat, and what threats it faces. Surveys for species that are more readily detectible (e.g., California tiger salamander, California red-legged frog) may detect whether the species' range is increasing or decreasing. For species that are sufficiently detectable to obtain estimations of population size or probability of detection (e.g., western burrowing owl, many covered plants), monitoring a randomly selected subset of the population in order to make statistical inference to the whole population can be achieved through adherence to the principles listed below.

- Develop and state the assumptions in the hypotheses and models *before* collecting monitoring data or conducting manipulations such as experiments and adaptive management.
- When designing an experiment or using adaptive management, select the number and location of sampling units so as to apply sufficient scientific rigor for evaluating the hypothesis being advanced.
- Replicate in space and time the number of the sites surveyed for population estimates and/or those receiving a management action. Use controls when appropriate.
- Measure the sensitivity of variables to reflect true changes in the resource being sampled. When appropriate, adjust counts, measures of species richness, and determinations of patch occupancy (i.e., presence/absence) with an estimate of detection probability as described by Lancia et al. (1996), Yoccoz et al. (2001), and Pollock et al. (2002).

Sampling Design

Sampling design will vary with the goals and phases of monitoring. During the inventory phase, baseline inventories may require a less rigorous sampling design, relying, for example, on visual surveys for detecting presence or absence. "Rapid Assessment" techniques may also be used. As on-the-ground monitoring progresses, site selection and replication merit increased attention based on the goals of the monitoring at that time.

An important goal in sampling and experimental design is to minimize extraneous variance in the measured values of indicators or variables. Selection of variables will be guided by a thorough knowledge of the ecological relationships that drive natural communities. Sampling intensity and probability of detection will be considered to ensure that all covered species are adequately inventoried and monitored. Recent studies have indicated that monitoring programs that fail to address issues of detectability and spatial variation have drastically overestimated population trends over time (Martin et al. 2007). Prior to implementing simple count-based indices for population trends for covered species, researchers must have confidence that detectability will remain constant over time. Methods of data analysis will be established prior to study design, and a statistician or biologist with sufficient statistical expertise will be consulted. Issues to consider (Scheiner and Gurevitch 1993) are listed below.

- Availability of sites on which treatments can be applied.
- Availability of reference sites.
- The site-selection process (is it random? stratified random? non-random?).
- Systematic versus opportunistic sampling.
- Detection probability of the protocol.
- Replication versus pseudo-replication (Hurlbert 1984).
- The clarity of hypotheses.
- Sufficient statistical power (1-β) or significance level (α).

7.3 Monitoring and Management Actions

7.3.1 Landscape-Level Actions

Landscape-level monitoring will be directed at tracking large areas, landscape-level processes, and regional issues that affect the study area. **Table 5-1a** correlates landscape-level monitoring actions with biological goals and objectives for landscapes. Landscape-specific issues such as linkages, invasive nonnative plants and animals, disturbance, disease, and hydrology are described in **Appendix J** *Monitoring Issues and Tools*. The section below summarizes the specific monitoring actions that the Implementing Entity will carry out to track environmental issues at the landscape level and ensure that landscape-level goals and objectives are being met. Compliance monitoring is described above in Section 7.2.1 *Types of Monitoring* and will take place at all levels of monitoring, including the landscape level.

Assimilate Results of Pre-Acquisition Assessments and Other Surveys

Information on landscape features will be collected through pre-acquisition assessments, including 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, that provide information on the extent, quality, and distribution of land cover types in the Reserve System. These data will be used to refine existing species habitat models and develop natural community conceptual models (see **Appendix J**, Sections J.2.2 *Natural Community Monitoring Tools* and J.3.1 *Species-Specific Monitoring Tools*, and **Figures 7-6 through 7-9**). Additionally, this information will be combined with landscape-level information being collected by others in the region to provide resource managers, including the Implementing Entity, with an understanding of how critical biological resources are generally trending under the influence of Plan implementation as well as under the influence of other human activities and other environmental factors (e.g., fire, drought, disease). Annual information on

precipitation and whether the study area is experiencing a wet or dry water year will also be collected to facilitate trends analysis and potential impacts on baseline and other surveys for covered species and natural communities.

Refine Land Cover Maps

At the landscape level, the Implementing Entity will monitor, using aerial photos or satellite imagery, the extent and distribution of land cover types within the study area every 5 years. If feasible, this monitoring could occur at a more refined level following significant natural events that affect the reserve system (e.g., flood and wildfire). This effort will begin during the Inventory Phase but will continue throughout all phases of Plan implementation. Land cover mapping will be verified in the field at sites where air-photo interpretation is difficult. Species models, including maps, will be improved as new data become available.

Assess and Monitor Landscape Linkages

Prioritizing, acquiring, assessing, managing, and monitoring landscape linkages are important tasks at the landscape level (**Table 5-9** and **Figure 5-6**). One of the primary goals of the conservation strategy is to sustain and enhance the effective movement and genetic exchange of native organisms within and between natural communities inside and outside the study area. To monitor landscape linkages the Implementing Entity will use a combination of compliance monitoring (to ensure that land acquisition requirements are met) and effectiveness monitoring (to ensure that species utilize linkages effectively and that management actions to increase permeability or improve connectivity are successful). Effectiveness monitoring will include studies of wildlife and plants.

The inventory phase of monitoring will prioritize acquisition of linkages, develop management protocols to enhance linkages, and develop success criteria for the effectiveness of linkages at sustaining movement and genetic exchange. The targeted studies phase will test methodologies for monitoring linkages. The Implementing Entity will evaluate whether linkages are successful at the small scale (e.g., testing use of culverts by target species using camera traps, track plates, or other techniques) and the large scale (e.g., testing connectivity by monitoring indicator species such as elk or badger or through genetic testing of target species). Studies on plant linkages will focus on plant dispersal dynamics and success (Bullock et al. 2006) and on genetic exchange between populations if and where possible. The objective of the targeted studies phase is to determine the most cost-effective and accurate way of evaluating whether landscape linkages are functioning within the context of the Plan. The long-term monitoring phase will implement methodologies identified in the targeted studies phase.

The Implementing Entity will institute a data-collection program to better understand how wildlife moves within and through the study area, both inside and out of the Reserve System. This data-collection program will be initiated

within the first 2 years of implementation. The data collected through this effort will be available for design and implementation of covered road projects. This program will remove the burden of data collection from each participating agency and ensure that all the data collected during the permit term is collected and collated consistently, is maintained in a central location, and is accessible. The conservation strategy includes funding for a feasibility study to determine the extent and needs for wildlife movement in three focal areas: Tulare Hill to Anderson Reservoir, Pacheco Creek (SR 152), and the Pajaro River (see Chapter 5, Section 5.3.2 *Landscape Conservation and Management*, subsection *Feasibility Study*. This feasibility study will be an important part of the data-collection program for wildlife movement in the study area.

Data collection will consist of two parts: monitoring the presence/absence of target species at designated locations across the study area, and monitoring the presence/absence of target species in specific locations determined by future covered activities. Data collection at consistent locations will entail regular and repeatable monitoring at strategic pinch points (e.g., culverts, bridges) in the study area to determine if existing linkages provide connectivity and if enhancement of these crossings increases wildlife movement. This component of the program could entail establishing monitoring stations at specific points or walking transects. Data-collection techniques could include those listed below.

- Installing motion-activated cameras (video or still).
- Installing and monitoring track plates.
- Visual documentation of tracks, scat, or individuals.
- Radio tracking individuals.

By coordinating with the Local Partners, specific monitoring efforts will be implemented in areas where covered activities (e.g., road widening, urban expansion, creek restoration) are planned to occur in the future. This component of the data-collection program can be used to inform project design and to determine more precisely the cumulative impacts that covered activities will have on habitat connectivity in the study area.

In addition, all structures constructed for wildlife movement (tunnels, culverts, underpasses, fences) will be monitored at regular intervals by the Local Partner facility owner and repairs made promptly to ensure that the structure is in proper condition. For facilities owned by entities not participating in the Habitat Plan (e.g., California Department of Transportation [Caltrans]) and where feasible, the Implementing Entity will secure access and data collection agreements with these entities to allow the Implementing Entity to conduct this monitoring.

Track Climate Change

As indicated in Chapter 10 *Assurances*, climate change-related remedial measures will be triggered if there is an increase in temperature greater than 3°C for any of the three baseline periods measured as a 10-year running average (see

Chapter 10, Section 10.2.1 *Changed and Unforeseen Circumstances*). The annual report will document changes in temperature in the study area throughout the permit term.

Track Invasive Species

A primary goal of the Plan is to enhance or restore representative natural landscapes to maintain or increase native biological diversity. To that end the conservation strategy proposes to eradicate or reduce the cover, biomass, and distribution of targeted populations of nonnative invasive plants. Within the Reserve System, the Implementing Entity will map occurrences of invasive nonnative plants as described in **Appendix J**, Section J.1.2 *Landscape Monitoring Tools* subheading *Mapping of Invasive Plants.*

Monitoring protocols for invasive plants will be coordinated with those of other local entities to ensure consistency with these programs and facilitate the sharing of monitoring results. This monitoring information will be used to determine the need for management actions to control the spread of existing invasive plants as well as potential future invasions. The effectiveness of control methods will also be reviewed. This monitoring information will be shared with state and local land management agencies charged with the control of invasive plants, including the Bay Area Early Detection Network (www.baedn.org) and the California Invasive Plant Council (www.cal-ipc.org) as well as with managers of adjacent public lands.

During the inventory phase of monitoring, the Implementing Entity will identify and prioritize problems; map occurrences of invasive plants, if possible; develop an exotic species control program; and develop success criteria for the effectiveness of eradication or reduction efforts. The targeted studies phase will develop protocols for invasive species monitoring and test methodologies for monitoring eradication efforts. The objective of the targeted studies phase is to determine the most cost-effective and accurate way of controlling invasive species. The long-term monitoring phase will entail implementation of methodologies identified in the targeted studies phase.

Occurrences of invasive animals will also be documented in GIS and management actions will be developed to prioritize and address nonnative, disruptive animals. For example, feral pig is an invasive species of special concern. Rooting disturbance by feral pigs allows nonnative invasive plants to establish in grassland and aquatic communities, and fall acorn foraging likely has a detrimental effect on oak regeneration (Sweitzer and Van Vuren 2002). During the inventory phase, areas frequented by feral pigs will be identified for feral pig eradication (through hunting and trapping) and exclusion (using fencing exclosures and cages). During the targeted studies phase, protocols will be developed to monitor the presence/absence of feral pigs over time. Monitoring will track the effectiveness of feral pig eradication and ensure that exclosures from grassland, oak woodland, and aquatic habitat types are effective and maintained. In addition, protocols will assess the extent and types of damage to vegetation and soils caused by pigs, including detection of exotic plant species in

areas of pig rooting. These protocols will then be used as part of long-term monitoring for feral pig eradication and exclusion.

Instances of disease will be monitored and reported, as they are discovered. The Implementing Entity will maintain a watchlist of dangerous diseases for the study area and will periodically monitor animals and plants, as part of species and natural community monitoring, to ensure that any occurrences of diseases are identified.

The Implementing Entity will track, on an annual basis, the status of diseases and nonnative invasive species in order to expeditiously initiate remedial actions described in Chapter 10, Section 10.2.1 *Changed and Unforeseen Circumstances*.

Track Recreation in the Reserve System

Many areas of the Reserve System will serve the dual purpose of habitat protection and limited recreational use. The impacts of recreational use on biological resources must be monitored and managed adaptively to reduce or eliminate impacts. During the inventory phase, potential impacts on species and communities will be identified, recreational plans developed, and protocols created to evaluate effects of public access and use. During the targeted studies phase, signs of disturbance from recreational use will be documented and assessed annually using established protocols. Long-term monitoring will track trends in recreation impacts to adjust management practices to reduce or eliminate impacts.

Monitor Disturbance Events

Disturbance events such as fire, flood, and earthquakes will be monitored opportunistically. Should fire or flooding occur in an area that has been previously monitored, the Implementing Entity will ensure that post-disturbance monitoring takes place and that results are incorporated adaptively into management actions. Additional information regarding disturbance tracking is described below, in Section 7.3.2 *Natural Community–Level Actions* subheadings *Chaparral and Northern Coastal Scrub* and *Oak and Conifer Woodland Actions*. The Implementing Entity will monitor the effects of these natural disturbances and implement remedial actions as described in Chapter 10, Section 10.2.1.

7.3.2 Natural Community–Level Actions

Natural-community-specific issues such as keystone species, predation, fire, livestock grazing, and altered stream flow are described in **Appendix J** *Monitoring Issues and Tools*. The section below summarizes the specific monitoring actions that the Implementing Entity will carry out to track

environmental issues at the natural-community level and ensure that natural-community-level goals and objectives are being met.

Grassland Actions

As described in Chapter 5 *Conservation Strategy*, adaptive management in grasslands will be focused on the maintenance and enhancement of native grasses, the benefit of covered species, and the promotion of native biological diversity. Monitoring actions will focus on the effectiveness of management to reduce the presence of nonnative plants, to increase the extent and diversity of native plants, and to promote keystone species (i.e., California ground squirrel) within the natural community for the benefit of native plants and animals, including covered grassland species such as Bay checkerspot butterfly, California tiger salamander, serpentine plants, western burrowing owl, and San Joaquin kit fox. **Table 5-1b** correlates natural community monitoring actions with biological goals and objectives for natural communities.

The monitoring program will evaluate the success of key management techniques such as livestock grazing, prescribed burning, mowing, and seeding to promote native plants and reduce the cover and biomass of nonnative, invasive plant species. Additionally, the program will track the ground squirrel population and evaluate the effectiveness of management and promoting additional burrows and monitoring burrow use. Finally, the monitoring program will track the impacts of nitrogen deposition and other threats on natural community function.

Assess Condition of Natural Communities

The Implementing Entity will conduct monitoring to assess the status and trends of the grassland community and to evaluate community function. If feasible, information on the historical ecology of grassland will help guide assessments. The tasks listed below will be carried out to document the baseline conditions from which change will be measured.

- Use pre-acquisition assessments and site inventories to document the distribution and vegetation types of grasslands, including patches of serpentine grassland and rock outcrops not captured in existing maps. Methods to quantify and track the conditions of vegetation types will follow those of existing studies such as the vegetation sampling conducted by the CNPS along Coyote Ridge and WRA Environmental Consultants at the Silver Creek Preserve (Evens and San 2004; WRA Environmental Consultants 2006).
- Develop a management-oriented conceptual model for grasslands that includes important factors such as the effects of rainfall, temperature, fire, herbivory (i.e., grazing) and succession to woody communities (e.g., chaparral/scrub or oak woodland), and identify indicators for community function as well as any critical uncertainties that may require additional directed studies (**Figure 7-8**).

- Assess and monitor invasive nonnative plants. This task will entail developing maps and descriptions of the distribution and abundance of target species; their known or potential effects on ecosystem function; native biological diversity; sensitive natural communities; covered species; and the means and risk of the spread of nonnative species to other areas within and outside the reserves. Focus on species that have the greatest potential to threaten grasslands such as yellow and purple star-thistle, barbed goat grass, teasel, and others.
- Assess the historic extent, conditions, and fire return interval of grassland within the study area using aerial photographs and historic records.
- If prescribed burns are feasible and desirable, prepare burn plans that describe pre- and post-burn monitoring to determine effects.
- Assess grassland landscape connectivity between reserves.
- Asses and track the health of serpentine rock outcrops and serpentine seeps if necessary beyond the monitoring for rare plants that occur in these communities (Santa Clara Valley dudleya and Mount Hamilton thistle).
- Examine potential negative impacts of grazing on sensitive communities and substrates such as rock outcrops and seeps.
- Identify and track additional threats (such as nitrogen deposition) and manage adaptively to contain these threats.

Monitor Actions to Promote Native Plants and Reduce Invasive Species

As discussed in Chapter 5 *Conservation Strategy*, the biological goals and objectives for grasslands include implementation of management actions that will promote propagation of native plants, reduce and control invasive nonnative species, and encourage native biodiversity through the maintenance of dynamic mosaics of vegetation types and biological gradients. Specific tasks to further these goals and objectives are listed below.

- Develop success criteria for grassland enhancement and evaluate the success of management actions (i.e., grazing, burning, mowing, and seeding) in reducing nonnative plants and promoting the extent and diversity of native plants.
- Develop guidance for grazing within the study area and grazing plans for specific parcels, as applicable, using an experimental approach to achieve the biological goals and objectives.
- Develop pilot projects that test the effects of different grazing practices (e.g., grazing intensity, duration, season, species) on the maintenance and regeneration of native grasses and forbs. If possible, combine grazing treatments with other management techniques such as prescribed burns and hand seeding to detect interactions between management treatments.

- Evaluate the success of any herbicide applications used to control nonnative plants in target areas.

Monitor Ground Squirrel Populations and Burrow Use

As discussed in Chapter 5 *Conservation Strategy*, California ground squirrel is considered a keystone species in grassland habitats. Because of its importance in functioning as a prey base for some predatory covered species and providing refugia for some terrestrial covered species, it will be important to monitor populations and/or burrow use and density. At the same time, historical rodent-control programs will need to be continued in localized areas to protect vulnerable infrastructure (e.g., pond berms, levees, road embankments, dam faces). The tasks necessary to carry out the goals and objectives pertaining to fossorial mammals are listed below.

- Monitor ground squirrels and/or populations of other small mammals to determine the abundance of prey and burrows for several covered species (e.g., western burrowing owl, California tiger salamander) and many common species.
- Determine if ground squirrel burrows are being used by target species.

Chaparral and Northern Coastal Scrub Actions

Adaptive management and monitoring of the chaparral and northern coastal scrub communities are built around the conservation goal of maintenance and enhancement of these communities for the benefit of covered species and the promotion of native diversity. To ensure the long-term persistence of the communities, monitoring actions will focus on the effectiveness of management to promote regeneration and succession by maintaining and establishing natural disturbance patterns to create stands of various ages and promote biological diversity.

Many of the plants in the chaparral and northern coastal scrub communities have evolved to be dependent on a disturbance regime of periodic fire for regeneration and succession (Holland 1986; Hanes 1988; Schoenherr 1992). In chaparral communities, disturbance causes canopy openings that allow for the growth of herbaceous vegetation, which is normally shaded out by a nearly continuous shrub stand. In both chaparral and northern coastal scrub communities, chemicals in smoke and charred wood also stimulate germination in a wide variety of native forbs that lie dormant as seeds in the soil for decades before a fire (see Chapter 3). Periodic disturbance allows for structural diversity by creating a range of age classes and promoting successional diversity within the communities. Also, periodic disturbance prevents the encroachment of both grasslands and conifer woodland and forest into chaparral and scrub.

The monitoring program will evaluate the success of burning or mechanical thinning to maintain canopy gaps and promote regeneration. Monitoring will

also focus on identifying areas where adjacent natural communities are encroaching into chaparral and scrub so that appropriate management actions can be implemented at those sites.

Assess Condition of Natural Community

Regeneration and succession stages within the chaparral and northern coastal shrub communities will be managed through both a prescribed burn program and mechanical thinning. The tasks listed below will be carried out to document the baseline conditions from which change will be measured.

- Use pre-acquisition assessments (updated land cover mapping, assessments of habitat suitability for covered species, air photo interpretation) and other field verification to establish the distribution and abundance of small stands of chaparral and northern coastal scrub (<10 acres) not mapped for the Plan that may be important in increasing connectivity between larger stands.
- Develop a conceptual model for the natural community and identify indicators for community function as well as any critical uncertainties that may require additional directed studies.
- Assess the historic extent, conditions, and fire frequency of chaparral and northern coastal scrub stands within the study area using aerial photographs and historic records of fire in the area. This information will be used to determine whether active management is required to maintain the structural diversity of these stands in their current extent and condition.
- If prescribed burns are feasible and desirable, prepare burn plans that describe pre- and post-burn monitoring to determine effects.
- Identify areas where grassland, oak woodland and Douglas-fir habitats are encroaching on chaparral scrub, paying close attention to patches that are necessary for maintaining landscape connectivity.
- Conduct targeted research identifying key factors affecting regeneration and succession.

Evaluate Effects of Periodic Disturbance

It is necessary to monitor the responses of the chaparral and scrub communities to wildfires, prescribed burning, and mechanical thinning. The tasks necessary to determine the response of these actions on promoting canopy gaps, regeneration, and succession in chaparral and northern coastal scrub are listed below.

- Develop structural diversity success criteria and compare post-treatment conditions to baseline conditions to measure the effectiveness of prescribed burning on natural community regeneration and succession.
- Compare results of mechanical thinning to structural diversity success criteria and baseline conditions, and measure the effectiveness of mechanical thinning on natural community regeneration and succession.

Track Adjacent Natural Community Encroachment into Chaparral

The use of prescribed burns is intended to prevent the encroachment of adjacent natural communities into chaparral and scrub communities. Areas burned too frequently risk conversion to grassland, whereas too infrequent burning may result in tree community encroachment. Where the use of prescribed burns is not feasible, there is an increased risk of the spread of trees, especially conifers, into chaparral and scrub communities. For example, there are areas in the Santa Cruz Mountains and in the Diablo Range in Henry W. Coe State Park where conifer encroachment has already taken place. This encroachment presents a risk of not only overall loss of habitat extent, but also the loss of key stepping stone patches necessary for maintaining habitat connectivity and corridors for species movement and distribution. The tasks necessary to track the spread of natural communities into chaparral and scrub are listed below.

- Monitor chaparral and scrub stands within reserves through vegetation sampling and periodic interpretation of aerial photographs to ensure that the overall extent of these stands is not declining substantially.
- Adaptively manage the community to prevent encroachment of grassland, oak woodland, and confer forest in target areas where any significant encroachment is identified.

Oak and Conifer Woodland Actions

The conservation goal of maintenance and enhancement of oak and conifer woodland communities to benefit covered and other native species serves as the basis for the adaptive management and monitoring strategy. To ensure the long-term persistence of these communities, monitoring actions will focus on the effectiveness of management to enhance the natural processes and native species diversity found in these communities.

Persistence of native plant diversity in oak and conifer communities is dependent on a variety of limiting factors. Seedling recruitment and regeneration within oak woodlands can be limited by invasive weeds and nonnative plants in the understory (Jones & Stokes 1995), mammal herbivory (Borchert et al. 1989; Bartolome et al. 2002; Tyler et al. 2002), and seed predation by feral pigs (Sweitzer and Van Vuren 2002). Depending on timing, frequency, and intensity, fire may have a negative or no effect on recruitment and regeneration in oak woodland (Griffin 1977; Bartolome et al. 2002). However, fire decreases the density of understory weeds and plants, indirectly creating favorable conditions for recruitment and regeneration. Because of the complex interactions of herbivory, grazing, competition from invasive plants, and native species composition, monitoring in the community will focus on determining the primary limiting factors.

In conifer woodlands, plant species recruitment and regeneration are influenced by the buildup of dead plant material on the forest floor and the frequency and

intensity of fire. Periodic fire allows for increased structural and biological diversity by increasing the number of native herbs, creating favorable soil conditions for seedling establishment, and stimulating seed release of closed-cone serotinous pines (Vogl et al. 1988). Like oak woodlands, conifer woodlands can be adversely affected by frequent or intense fires.

Certain areas of oak and conifer woodlands have been severely limited in their ability to recruit and regenerate native species, resulting in the loss of natural processes and native species diversity (Pavlik et al. 1991). These areas will be identified and targeted for enhancement within the study area.

The monitoring program will evaluate the effects of wildfires, prescribed burning, and mechanical thinning on the regeneration and recruitment of dominant plants in oak and conifer woodlands. Additionally, the effectiveness of other enhancement efforts will be evaluated at target sites.

Assess Condition of Natural Community

Recruitment and regeneration within the oak and conifer woodland communities will be managed through a limited prescribed-burn program, mechanical thinning, and other enhancement tools (e.g., seeding). Documenting the baseline conditions against which change can be effectively evaluated will entail the tasks listed below.

- Using recent aerial photographs, document the range of percent canopy coverage within the Reserve System to estimate structural habitat diversity.
- Use pre-acquisition assessments, site inventories, and other surveys to establish the distribution, abundance, and age structure of each species of oak and conifer within the Reserve System.
- Determine the status of tree recruitment using historical aerial photographs (e.g., Grossinger et al. 2006; San Francisco Estuary Institute 2008). Determine if the current canopy coverage of oaks is increasing, decreasing, or stable within the Reserve System.
- Assess oak stands (e.g., canopy coverage, tree condition, seedling and sapling abundance and survival, population age structure, acorn production) within 2 years of acquisition of each reserve to identify factors that may be limiting ecological functions. If canopy coverage is declining and/or tree recruitment is insufficient, adaptive management actions will be implemented to improve recruitment. These actions will be site specific and may include modifying livestock practices, replanting; fencing saplings; reducing competing herbaceous vegetation; and controlling wild pigs.
- Develop a management-oriented conceptual model for the natural community (see **Figure 7-8** for an example) and identify indicators for community function as well as any critical uncertainties that may require additional directed studies.
- If prescribed burns are feasible and desirable, prepare burn plans that describe pre- and post-burn monitoring to determine effects.

- Begin pre-treatment monitoring of sites considered for enhancement. Develop criteria for measuring success.

Evaluate Effects of Periodic Disturbance

It is necessary to monitor the responses of the oak and conifer woodlands to wildfires, prescribed burning, and mechanical thinning. The tasks listed below will be carried out to determine the effect of these actions on promoting regeneration and recruitment.

- Develop structural diversity success criteria and compare post-treatment conditions to baseline conditions to measure the effectiveness of prescribed burning on natural community regeneration and recruitment.
- Compare results of mechanical thinning to structural diversity success criteria and baseline conditions to measure the effectiveness of mechanical thinning on natural community regeneration and recruitment.
- Monitor success of burning and thinning to increase native species diversity in mid-canopy and understory of redwood forest, ponderosa pine woodland, and knobcone pine woodland.

Evaluate Seeding, Planting, and other Enhancement Efforts

The tasks listed below will be conducted to determine the response of enhancement and restoration actions on promoting regeneration and recruitment in oak woodlands.

- Determine indicator species for enhancement efforts and develop success criteria.
- Monitor success of enhancement efforts (seeding and planting, altered livestock practices, fencing saplings, reducing competing herbaceous vegetation, and controlling wild pigs).

Stream and Riparian Forest and Scrub Actions

Adaptive management and monitoring of stream and riparian forest and scrub are focused on the protection, restoration, and enhancement of these communities for the benefit of covered species and the promotion of native diversity. To ensure the long-term persistence of these natural communities and the species they support, monitoring actions will be the responsibility of the Implementing Entity[5] and will focus on the effectiveness of management to accomplish the following:

[5] In some cases, it may be appropriate for the Implementing Entity to contract with SCWVD to conduct monitoring activities within some streams, particularly where there is overlap in covered species and monitoring responsibilities between the Habitat Plan and the proposed Three Creeks HCP.

- improve habitat quality and connectivity for native fish, amphibians, reptiles, and riparian birds;
- establish or duplicate the effects of natural disturbance in target areas;
- enhance or restore riparian forest and scrub;
- improve channel function; to reduce anthropogenic sediment input to and storage in streams; and
- decrease the spread of nonnative invasive plant species.

Riparian woodland is dominated by trees and shrubs associated with streams and permanent and intermittent water sources. Riparian scrub is an early successional stage of riparian forest. Due to its dependence on stream channels, riparian vegetation is adapted to a particular disturbance regime. The dominant riparian species (Fremont cottonwood, white alders, and several willow species) generally require bare mineral soil and high light levels for germination. Floods can provide these conditions through the processes of erosion and deposition.

Streams throughout the study area are highly regulated due to the presence of reservoirs and the role of streams as conveyance features for flood protection and water supply (groundwater percolation). Reservoirs modify stream flows, reducing flood peaks and increasing summer stream flow, including during many drought years. The conservation strategy aims to improve the habitat quality of streams and to increase overall ecological functions and values (e.g., native species richness and diversity, vegetative cover, wildlife habitat function). The monitoring program will evaluate the effectiveness of achieving these objectives as well as additional objectives focused on promoting community functions, habitat heterogeneity, and connectivity, including specific success criteria for maintaining hydrologic and geomorphic stream processes or duplicating their effects.

Assess Condition of Natural Community

The establishment of ecological indicators and establishment of success criteria are integral to ensure the maintenance and restoration of habitat quality and ecological functions and values for the covered species. Documenting the baseline conditions against which indicators and success criteria can be effectively evaluated will entail the tasks listed below.

- Use pre-acquisition assessments and site inventories to verify the distribution and abundance of riparian forest and scrub mapped from air photos, and to develop maps of permanent, intermittent, and ephemeral streams.
- Inventory riparian and stream corridors within or outside of the reserves to identify stream segments suitable for enhancement or restoration. Corridors outside reserves will be identified based on importance for covered species and access.

- Use data from USGS gauging stations and/or weather stations to collect information on flood processes and their effects on other hydrogeomorphic processes and riparian communities.
- Assess the connectivity of stream and riparian corridors throughout the study area and between reserves and other public lands.
- Develop a management-oriented conceptual model for streams and riparian forest and scrub (see **Figure 7-8** for an example for grasslands), and identify indicators for community function as well as any critical uncertainties that may require additional directed studies.
- Assess nonnative invasive plants (e.g., giant reed, Acacia), including maps and descriptions of their distribution and abundance; their known or potential effects on ecosystem and hydrogeomorphic functions, native biological diversity, sensitive natural communities, and covered species; and the means and risk of their spread to other areas inside and outside the reserves.
- Investigate and document historical natural disturbance regimes in streams, and document hydrologic changes that may be affecting stream and riparian systems.

Monitor Riparian Restoration Projects

Monitoring restored riparian habitat will ensure that the natural community is functioning as habitat while providing for ecological processes in the larger landscape. Prior to the initiation of restoration projects, the effects of restoration techniques tested in pilot projects[6] must be evaluated for their efficacy in restoring or duplicating the effects of ecological processes, habitat quality, native cover regeneration, and hydrogeomorphic conditions. It is from these pilot projects that indicator species will be selected and success criteria developed for large-scale restoration projects. The monitoring activities listed below will be the responsibility of the Implementing Entity[7] and will ensure that financial resources are properly allocated and greater success in restoration efforts is achieved.

- Evaluate existing programs for successful monitoring protocols that are appropriate to riparian restoration within the study area.
- Initiate a pilot project to develop restoration measures for individual sites or stream reaches. These measures will include descriptions of plant material requirements (e.g., collected and propagated from local sources); planting and construction methods; and adaptive management and monitoring

[6] Although individual project proponents would not be required to carry out pilot studies, the Implementing Entity will evaluate restoration and/or creation proposal based in part, on pilot studies conducted for the Reserve System. The Implementing Entity will also consider the history of the project proponent performing successful wetland restoration elsewhere and whether the restoration or creation project is consistent with the conservation strategy of the Plan.

[7] The same riparian, stream, wetland, and pond monitoring requirements apply to all Permittees and those under their jurisdiction when aquatic restoration is proposed to offset wetland fees (see Chapter 9, Section 9.4.1).

requirements. The results of pilot projects will guide future restoration efforts.

- Determine indicator species for monitoring restoration, and develop success criteria such as the amount of Shaded Riverine Aquatic (SRA) habitat.
- Monitor the effects of active and passive restoration throughout the Reserve System in target reaches. Success criteria will be developed during Plan implementation and could include the creation of native cover and the restoration of natural hydrogeomorphic and ecological processes as well as native- or covered-species response.
- Monitor the effects of livestock access and livestock exclusion on community composition and recruitment of dominant trees and shrubs.
- Monitor mitigation sites that are beyond their establishment periods (i.e., no longer sustained by irrigation), but have not achieved their success criteria, for stress due to low soil moisture or high evapotranspiration rates. See Chapter 10 *Assurances* for remedial measures if drought occurs (*Drought*).
- Monitor SCVWD natural reservoir inflow data in the study area to determine if the seasonal inflow at the end of April indicate a dry year (near 75% of inflow). See Chapter 10 *Assurances* for remedial measures if drought occurs (*Drought*).

Evaluate Effects of Periodic Disturbance

It is necessary to monitor the responses of river and riparian communities to periodic flooding. The value of promoting a natural floodplain or allowing target areas to flood will be assessed opportunistically. The tasks listed below will be conducted by the Implementing Entity to determine the response of flooding on creating or maintaining riparian vegetation and improving channel structure.

- Develop structural diversity success criteria and compare post-treatment conditions to baseline conditions to measure the effect of flooding on natural community regeneration and succession.
- Compare results of mechanical thinning (an action which could mimic the effects of natural flooding and drought) to structural diversity success criteria and baseline conditions and measure the effectiveness of mechanical thinning on natural community regeneration and succession.

Monitor Stream Restoration Projects

Monitoring stream restoration projects will focus on the recreation of the natural hydrogeomorphic processes of confined and degraded stream channels and the restoration of ecological processes. Removal of confined channels restores floodplain connectivity, allowing for greater dispersal distances of target species that use both aquatic and upland habitats. Stabilization of degraded stream channels reduces stream impairment by anthropogenic sources of sediment. The

tasks listed below will be conducted by the Implementing Entity to evaluate the efficacy of stream restoration projects.

- Develop success criteria and monitor success of restored areas in recreating natural hydrogeomorphic and ecological processes.
- Monitor sediment levels both pre- and post-bank stabilization.
- Determine if populations of target species are being restored and/or sustained through improvements in floodplain connectivity and reduced sedimentation. Use survey data from previous monitoring activities and augment the data with additional survey efforts to characterize the seasonal distribution, abundance, and species composition of the target species communities inhabiting restored streams.
- Monitor SCVWD natural reservoir inflow data in the study area to determine if the seasonal inflow at the end of April indicate a dry year (near 75% of inflow). See Chapter 10 *Assurances* for remedial measures if drought occurs (*Drought*).

Wetland and Pond Actions

Adaptive management and monitoring of wetland and pond communities supports the conservation goal of the maintenance, enhancement, and creation or restoration of ponds and wetland habitats for the benefit of covered species and promotion of native diversity. Monitoring actions will evaluate the effectiveness of management to preserve, enhance, create and restore ponds and to preserve and enhance seasonal and perennial wetlands by increasing native vegetative cover, biomass, and structural diversity within and around the margins. At the same time, monitoring actions will be used to evaluate efforts to reduce the cover and biomass of nonnative invasive plants, access by feral and domestic mammals, and numbers of predatory wildlife and fish species. Monitoring actions will also track the response of target species (e.g., California tiger salamander, California red-legged frog, western pond turtle, tricolored blackbird) to habitat management activities. A reasonable understanding of metapopulation dynamics in the vicinity of these management actions will need to be understood in order to determine whether the actions are causing the change in population level or the population is experiencing typical population fluctuation.

Assess Condition of Natural Community

The Implementing Entity will conduct monitoring to assess the status and trends of the wetland and pond communities and to evaluate community function. The tasks listed below will be conducted to determine the baseline condition of wetland and pond communities.

- Use pre-acquisition assessments, site inventories, and other surveys to establish the distribution and abundance of ponds and wetlands within and adjacent to the Reserve System. Map the distribution and assess connectivity of wetlands, ponds, and associated upland areas.

- Develop a conceptual ecological model for wetlands and identify indicators for community function as well as any critical uncertainties that may require additional directed studies.
- Prioritize wetlands and ponds for enhancement, restoration, and creation efforts. Potential restoration sites will be identified and selected on the basis of their physical processes and hydrologic, geomorphic, and soil conditions to ensure that successful restoration can occur and be self-sustaining. Identify degraded stream reaches that can be used as pond creation sites.
- Identify wetlands and ponds with abundant nonnative predators or ponds where native species are affected by feral and domestic animal entry. Prioritize these sites for predatory species eradication and exclosures.
- Assess nonnative invasive plants, including maps and descriptions of their distribution and abundance; their known or potential effects on ecosystem function, native biological diversity, sensitive natural communities, and covered species; and the means and risk of their spread to other areas inside and outside the Reserve System.
- Begin pre-treatment monitoring of sites considered for enhancement, restoration, and creation and develop criteria for evaluating success. These criteria will be suitable to evaluate if habitat management increases hydrogeomorphic and ecologic functions, improves habitat value, increases landscape connectivity, and enhances the habitats' ability to support existing and new populations of covered species.
- Identify and track additional threats (e.g., disease, invasive) and manage adaptively to contain these threats.

Evaluate Habitat Enhancement, Restoration, and Creation Activities

It is necessary to monitor the effects of pond and wetland enhancement, restoration, and creation. The tasks listed below will be conducted to determine the response of these actions on increasing native vegetative cover, biomass, structural diversity, and regional connectivity for the benefit of covered species.

- Determine indicator species for monitoring enhancement, restoration, and creation and develop success criteria.
- Initiate pilot project to develop restoration, enhancement, and creation measures for individual sites on the basis of hydrologic conditions; extent and quality of existing habitats (e.g., percent native vegetation and presence/absence of exotic wildlife such as bullfrogs); existing wildlife use; and the potential for adverse effects (e.g., disturbance and/or removal of existing pond/wetland habitat). These measures will include descriptions of plant material requirements (e.g., collected and propagated from local sources); planting and construction methods; and adaptive management and monitoring requirements.
- Determine and quantify changes in habitat that result from wetland and pond enhancement, restoration, and creation. Monitor the survivorship of

planting; quantify vegetated perimeter of pond; and describe habitat quality, connectivity, and species response. Measure success based on criteria described in the monitoring component of the reserve unit management plan.

- Survey wetland and pond capacity and water duration and monitor to ensure that the ecological and hydrogeomorphic functions related to these parameters are maintained or improved.
- Determine use of artificially created ponds by covered species.
- Evaluate the use of wetland-upland complexes by covered species.

Evaluate Efforts to Reduce Impacts associated with Livestock and Nonnative Plants and Animals

It is necessary to monitor the results of efforts to reduce impacts caused by livestock and nonnative species on pond and wetland habitats. The tasks listed below will be conducted to evaluate these effects.

- Determine the effect on the vegetative community and the relative benefit to target covered species of different management treatments such as access/exclusion by livestock and feral pigs, pond draining, and predator control.
- Monitor and record populations and incursions of nonnative predators in target wetlands and ponds.
- Evaluate the success or potential adverse effects of any herbicide applications used to control nonnative plants in target areas.

7.3.3 Species-Level Actions

The Implementing Entity will conduct monitoring to assess the status of covered species and to determine the extent to which the conservation strategy described in Chapter 5 is being implemented and the extent to which biological goals and objectives for species are being met. Species-specific issues and tools are described in **Appendix J** *Monitoring Issues and Tools*. The section below summarizes the specific monitoring actions that the Implementing Entity will carry out to track environmental issues at the species level and ensure that species-level goals and objectives are being met.

Species monitoring will address the following issues relevant to the Plan.

- Status and trends of covered species and other relevant species within the Reserve System (i.e., status and trends monitoring).
- The response of covered species to HCP/NCCP species-specific conservation measures and adaptive management (i.e., effects-of-management monitoring).

- Directed studies to resolve critical management uncertainties for some covered species (i.e., directed studies).

In some cases covered species are the response variables for effects-of-management monitoring at the community level. In those cases, monitoring is described in Section 7.3.2 *Natural Community–Level Actions* above. Species have been categorized into three groups for the purposes of prioritizing monitoring and maximizing efficiencies (see Group numbers in following sections). The grouping of each species will be re-evaluated every 5 years, or if listing status changes, and species may move between the three categories during the course of Plan implementation. The target species for status and trend surveys in acquired parcels will be based on and informed by species models, CNDDB data and pre-acquisition assessments.

Group 1 species include most of the covered species that are currently listed as endangered or threatened by either state and/or federal wildlife agencies. In most cases, the study area constitutes a critical portion of the species' range. Baseline surveys will be initiated within 1 year of land acquisition. Species-specific conceptual models for Group 1 species will be initiated within 1 year of implementation. Within the year, monitoring variables and additional indicators (biotic or abiotic) will be selected. A survey schedule will be developed to ensure that species status is monitored at the appropriate seasonal periods within the year.

Initially, Group 1 species will be monitored on an annual basis; however, the frequency of monitoring may be adjusted on a species-by-species basis once the status of species in the Reserve System is established. For example, if red-legged frogs have been monitored annually for 15 years and their populations are known to be stable or growing, annual monitoring may be adjusted to bi-annual monitoring in order to reserve budget for other conservation or monitoring actions. Recommended annual monitoring is for species status monitoring only (i.e., not trends monitoring). However, monitoring frequency for species addressed in finalized USFWS Recovery Plans will not fall below the recommend frequencies in these plans. For example, at a minimum, Coyote ceanothus will be monitored every 3 years, as suggested in *The Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area* (U.S. Fish and Wildlife Service 1998).

Targeted studies and monitoring related to the effects of management actions will take place on a time schedule that is relevant to the specific effort at hand, and monitoring schedule for these activities will be developed on a case-specific basis. Success criteria and monitoring protocols will be developed to incorporate monitoring results into the adaptive management strategy. Finally, additional threats to species survival will be identified and tracked. These monitoring actions are common for all Group 1 species within the study area. Monitoring will ensure continued species existence within the study area by tracking species population status and trends.

Group 2 species are not currently listed, but the study area constitutes a critical portion of the species' range. On average, a moderate level of monitoring effort

will be needed for these species. Baseline surveys will be conducted within 2 years of land acquisition. Species-specific conceptual models will be developed on an as-needed basis. Monitoring variables and additional indicators (biotic or abiotic) will be selected within 1 year. A survey schedule will be developed to ensure that species status is monitored every 2–3 years. Success criteria and monitoring protocols will be developed to incorporate monitoring results into the adaptive management strategy. Finally, additional threats to species survival will be identified and tracked. These monitoring actions are common for all Group 2 species within the study area. Monitoring will ensure continued species existence within the study area by tracking species population status and trends.

Species in Group 3 may or may not be listed but the study area is not considered a critical component of the species' range. A relatively lower monitoring effort will be undertaken to establish the status and trends of these species. Baseline surveys will be conducted within 5 years of land acquisition. Monitoring variables and additional indicators (biotic or abiotic) will be selected. A survey schedule will be developed to ensure that species status is monitored at least every 5 years but up to annually, as appropriate. Success criteria and monitoring protocols will be developed to incorporate monitoring results into the adaptive management strategy. Finally, additional threats to species survival will be identified and tracked. These monitoring actions are common for all Group 3 species within the study area. Monitoring will ensure continued species existence within the study area by tracking species population status and trends.

Monitoring Partial Impact to Plant Occurrences

In addition to status and trends monitoring within the Reserve System, covered plant occurrences that may be partially adversely affected by covered activities will be monitored. The purpose of the monitoring will be 1) to assess whether the impact reduces the long-term viability of the occurrence and whether supplemental management actions are feasible and warranted, and 2) to determine whether an additional occurrence must be protected, enhanced, or created in the Reserve System to offset this partial impact (as defined by Chapter 6, Section 6.6.2, subheading *Condition 20 Avoid and Minimize Impacts to Covered Plant Occurrences*). Baseline data will be collected before the covered activity is implemented.

Covered plant occurrences that are partially permanently affected (i.e., long-term viability is not reduced below the thresholds described in Chapter 6, Condition 20) by covered activities will be monitored by the Implementing Entity unless the impact is less than 5% of the total population size as measured by the number of individuals. If the impact is less than 5% of the total occurrence size, then the impact is not considered significant with regard to long-term viability and will not require monitoring nor will it count as a permanent impact. This exception applies to all covered plant species except Coyote ceanothus.

Specific monitoring protocols and success criteria will be developed during implementation as appropriate for each covered plant species, according to the

guidelines discussed here and in Condition 20 in Chapter 6. It is possible that only a portion of the occurrence will be located on the covered activity project site. In such instances, the monitoring protocol will address this issue. Three possible monitoring approaches include the following:

1. If the landowner agrees, the Implementing Entity will obtain access to the adjacent sites on which the rest of the plant occurrence is located, and surveys will include the entire occurrence.
2. If access to adjacent site(s) is not possible, or if for some other reason it is not feasible to survey the entire occurrence, then an alternative will be developed to estimate the extent and condition of the adjacent portion of the occurrence.
3. If only a small portion of the occurrence is on adjacent properties, then only the portion of the occurrence on the project site will be monitored and assessed for viability. The determination whether this is a full impact will be made based on the results for only the accessible portion of the occurrence.

Analysis of the monitoring results for annual species will take into account annual population variation that may have affected the baseline data. For example, if the baseline year was exceptionally wet, an annual population may have been very high. Subsequent reductions in population could be partially caused by drier conditions as well as impacts from the covered activity. If extreme or unusual climate conditions affect the species, then monitoring will be extended 1 or 2 years, as appropriate to assess impacts and success.

For annual species, the minimum post-construction monitoring period will be 5 years. Monitoring will include estimates of percent cover and number of individuals. An occurrence will be assumed to retain long-term viability and will not require replacement in the reserve system if the decline in occurrence size and percent cover from pre-project conditions is less than 25% over the monitoring period, unless site-specific conditions otherwise suggest substantial declines in viability.

For perennial species, the minimum post-construction monitoring period will be 3 years. Monitoring will include estimates of percent cover, recruitment of seedlings if impacts included removing individuals, and measurements of adult plant health (e.g., signs of disease, herbivory, nutrient deficiencies, etc.). An occurrence of a perennial covered species will be assumed to retain long-term viability and will not require replacement in the reserve system if the decline in seedling recruitment and percent cover from pre-project conditions is less than 25% over the monitoring period, unless site-specific conditions otherwise suggest substantial declines in viability.

Tables 5-1c and 5-1d correlate monitoring actions with biological goals and objectives for wildlife and plant species, respectively. Species-specific monitoring actions are discussed in detail below.

Bay Checkerspot Butterfly (Group 1)

Document and Monitor Species Status

Surveys for Bay checkerspot butterfly populations will be conducted on reserve lands with modeled serpentine grassland habitat. Two types of surveys will be conducted within the Reserve System: (1) surveys of larval and adult host plants and reconnaissance level surveys for adult butterflies in suitable but unoccupied habitat, and (2) surveys of post-diapause larvae in occupied habitat. Surveys will be conducted at the frequencies discussed above (i.e., annually) during either the appropriate flowering period for larval host plants, during the late larval period (February–March), or during the peak of the flight period for adults. Surveys will be consistently conducted at the same time of year to facilitate data analysis. Additional information on survey protocols and methodologies is described in the species account for Bay checkerspot butterfly in **Appendix D**).

During implementation, previously identified (through expert opinion and habitat model, **Appendix D**) Bay checkerspot butterfly habitat within the Reserve System will be surveyed for the presence of larval host plants. This information will be used to verify the Habitat Plan's Bay checkerspot butterfly population map in the Reserve System. This will be followed by annual reconnaissance level surveys for adult butterflies during the peak of the flight period. This will generally be pedestrian surveys through modeled habitat and butterflies will be identified with the aid of binoculars (Santa Clara Valley Water District 2005; Santa Clara Valley Transportation Authority 2006; WRA Environmental Consultants 2006). These surveys will serve to detect shifts in distribution and new colonization of habitat within the Reserve System. Following colonization, a more rigorous sampling approach will be used as described below. Surveys for new populations will be focused in areas of potential habitat near the largest patches of occupied habitat (Launer and Murphy 1994).

In areas where known Bay checkerspot butterfly populations persist, surveys for post-diapause larvae will occur to gain an estimate of relative abundance of individuals. Protocols for these surveys will use the best techniques available at the time, but in general will include annual sampling at permanent plots stratified to include microclimates present as the result of changes in topography and management regime (Santa Clara Valley Transportation Authority 2006; WRA Environmental Consultants 2006). Additional techniques such as timed larval counts will also be used. This can generate numbers of larvae observed per unit time (typically 10 minutes) and gives some indication of abundance in a given area (S. Weiss pers. comm.). Initially this protocol will establish an estimate of the baseline for each population identified in **Appendix D**. Baseline numbers of individuals may be known because most of these sites are already surveyed annually. In these areas all available existing information will be used and every attempt will be made to reduce the overlap in the survey efforts for efficiency.

Monitoring protocols will be developed to assist the Implementing Entity in demonstrating compliance with species occupancy requirements described in

Chapter 5, Section 5.3.1, subheading *Acquisition of Modeled Habitat for Covered Species*.

Evaluate Covered Species Response to Habitat Enhancement and Restoration

It has been shown that without some form of grassland management (e.g., grazing, mowing, seeding, and burning), serpentine grassland quickly becomes overrun with nonnative plants, and habitat quality decreases for Bay checkerspot butterfly (Weiss 1999) to the point where the species may be extirpated from a site. Accordingly, monitoring activity is ongoing to determine Bay checkerspot butterfly population response to grassland management (Weiss 1999; Fleishman et al. 2000; Hellman 2002; Santa Clara Valley Transportation Authority 2006; WRA Environmental Consultants 2006). As management techniques are implemented within the Reserve System on unoccupied sites, the number and distribution of larval host plants will be documented to determine how habitat quality has changed under different management regimes. In areas where Bay checkerspot butterfly populations already occur, population numbers will be monitored to determine how they are responding to management techniques.

Evaluate Use of Translocation to Establish New Populations

One important biological goal of this Plan is to increase the number of Bay checkerspot butterfly populations in the study area. To this end, serpentine habitat will be acquired and managed appropriately to support the species. During years when populations are at peak numbers, some individuals may disperse to these new reserves; it is hoped that, over time, there would be reproducing populations on those sites in most years. However, if acquisition and management occur but dispersal does not, then translocation of butterflies could be used to establish populations in new reserves (Harrison 1989). A translocation program would be conducted in a controlled and repeatable fashion that allows for quantification of the number of individuals gained or lost during the experimental process. Translocation efforts will be closely coordinated with CDFG, USFWS, and other species experts. Thresholds for loss of individuals would be established beforehand. Translocation would need to be approved by the Wildlife Agencies.

These experimental translocation efforts would be monitored using the methods discussed above.

Monitor Additional Threats

Although serpentine grasslands are typically more resistant than many other vegetation types to invasion by nonnative species, if the habitat is left unmanaged nonnative plants will eventually dominate serpentine grasslands. Monitoring

how grassland species richness changes under various management techniques is essential to understanding which techniques are most effective at retaining habitat for Bay checkerspot butterfly.

A number of pollutants, especially nitrogen-based pollutants, threaten Bay checkerspot butterfly. Deposition of excess nitrogen on serpentine grasslands can alter plant composition. Deposition of nitrogen acts to fertilize the nutrient-poor serpentine soil, exacerbating the problems caused by nonnative species (Weiss 1999). Continued monitoring of nitrogen deposition on serpentine soils and the benefits of managed grazing and controlled burns in areas such as Silver Creek Hills, Tulare Hill, and Santa Teresa County Park (**Appendix E** *Draft Estimation of Contributions to Deposition of Nitrogen in Santa Clara County for the Santa Clara Valley Habitat Plan*) as well as more precisely quantifying how an increase in passenger and commercial vehicle trips and other new industrial and nonindustrial sources will degrade these habitat types will continue to be a focus under this Plan. The monitoring report prepared each year will document at least one dry season and one wet season nitrogen deposition rate from monitoring conducted by the Habitat Plan or other sources.

California Red-legged Frog (Group 1)

Document and Monitor Species Status

Early in the breeding season (November–February, depending on local population behavior), when adult California red-legged frogs typically move into breeding habitat, surveys will be conducted to determine presence/absence of potential breeding adults. Surveys during the breeding season will be conducted based on the most recent protocols adopted by USFWS and CDFG (e.g., U.S. Fish and Wildlife Service 2005)[8],coordination with the monitoring efforts of other local agencies (e.g., Santa Clara Valley Water District 2005), and best available science.

Once it is established that potential breeding adults are present, a more in-depth survey during the breeding season, as defined by USFWS protocols, will be conducted to determine the size of the breeding population and an estimate of breeding success.

Surveys of all potential breeding habitat will be conducted on land acquired for the Reserve System. Initial surveys will be used to document baseline levels for population monitoring during the permit term and in perpetuity. This baseline information will document the factors listed below.

- Ponds, wetlands, or stream reaches occupied by adult red-legged frogs.
- Adult, larva, and egg mass numbers.

[8] Survey protocols developed by the Wildlife Agencies often have the goal of reliably detecting presence of a species within one or two seasons, which is the time available for most project planning cycles. The goal of surveys on reserve lands will be to definitively determine presence or absence. Wildlife Agency survey protocols may or may not address this monitoring goal.

- Unoccupied breeding habitat that may have the potential to support breeding populations. This item will include an evaluation of the possible factors hindering successful breeding at that location.
- Assessment of upland habitat for potential refugia around occupied and potential breeding habitat.
- Presence of bullfrogs and nonnative, predatory fish species in occupied or potential habitat.
- Presence of other factors (threats) seemingly affecting breeding success at a given location where breeding is occurring.
- Estimate of the distance between known or potential breeding sites to help guide creation or enhancement of more robust populations.

This information will be documented in GIS layers and used to prioritize areas for enhancement and restoration. The management actions for target upland areas surrounding breeding habitat will also be described. This will aide in prioritizing potential unoccupied breeding habitat to be enhanced or restored to support breeding adults in the future.

In years following baseline data collection, visual monitoring for California red-legged frog population status will take place annually, during the breeding season, as defined by USFWS protocols. Egg mass counts and adult counts obtained during visual surveys will be used to determine the local population of California red-legged frogs and will contribute to an overall population status and trends assessment across the Reserve System.

If sufficient information is not obtained via visual monitoring—dip-netting, seining, hand catching, or other methods developed during implementation will be used to capture adults, juveniles, metamorphs, and larvae in habitat where adults have been documented during protocol-level surveys. Those more intensive methods will only be employed every 5 years to minimize impacts on local populations.

Monitoring protocols will be developed to assist the Implementing Entity in demonstrating compliance with species occupancy requirements described in Chapter 5, Section 5.3.1, subheading *Acquisition of Modeled Habitat for Covered Species*.

Evaluate Covered Species Response to Flow Regulation

Flows could also change as a result of dewatering events described in Chapter 2, *Land Use and Covered Activities*. If California red-legged frog populations are found in streams hydrologically affected by existing dams in the permit area, the Implementing Entity will monitor the effects of flow regulation on the species.

Evaluate Covered Species Response to Habitat Enhancement, Restoration, or Creation

Potential breeding habitat that is targeted for enhancement, restoration, or creation of habitat will be monitored after treatment to determine the response of breeding California red-legged frogs to habitat-management actions. The relative success of different management actions for maintaining or increasing red-legged frog populations will be assessed to guide future management efforts.

The effectiveness of enhancement and restoration management actions in occupied breeding habitat will be monitored by observing changes in the number of egg masses detected during breeding-season surveys (as defined by USFWS protocols) over time. In addition, the numbers of adults, juveniles, meta-morphs, and larvae that are observed during those surveys will be used to help determine how population levels are responding. The available breeding habitat will be quantified in acres, and population numbers will be recorded as the number of detections per acre in ponds and wetlands. In streams, breeding surveys will cover the amount of riverine habitat that a surveyor can comfortably survey during an 8-hour period. Stream surveys are based on linear miles. In order to calculate acreage the width of the wetted stream channel will be taken for every 500 feet of linear survey and an areal estimate will be calculated. This area will be quantified in acres, and the number of detections per acres will similarly be recorded. Reserve unit management plans will identify which stream reaches, ponds, and wetlands will be monitored, and at what frequency the monitoring will occur, to determine habitat availability and population response to management actions. Those habitat features will be monitored to record changes over time. Monitoring frequency will be established in the reserve unit management plan.

In order to initially determine the peak egg-laying month for different parts of the Reserve System additional egg mass surveys will be conducted once a week, for select sites, during the peak egg-laying period (Bobzien and DiDonato 2007). Depending on rainfall and other seasonal factors, surveys could begin up to two weeks prior to or two weeks following the peak egg-laying month. March has been noted as the peak egg-laying period for California red-legged frogs in nearby Alameda and Contra Costa Counties (Bobzien and DiDonato 2007). The peak egg-laying period for the Reserve System will be determined by surveying the potential and known breeding sites once a week starting in the beginning of January until no more new egg masses are observed, in order to determine the peak egg-laying period for individual water bodies within the Reserve System. If egg masses are detected in the first round of surveys, the following year's surveys will begin earlier (1–2 weeks) so as to establish when the onset of breeding typically occurs. Once the peak egg-laying period is determined for different parts of the Reserve System, these weekly egg-mass surveys would cease and singular egg-mass surveys would be completed at the same time as visual surveys. The overall reproductive output (i.e., number of egg masses) will be recorded during the survey period and each will be recorded with a handheld GPS unit. Newly created ponds will be monitored in the same manner.

In some instances more specific monitoring will be conducted. For example, radiotelemetry studies have been designed to determine how a local population (breeding pond) of red-legged frogs uses the upland areas around that pond during the breeding and non-breeding season (Rathbun and Murphy 1996; Bulger et al. 2003). Radiotelemetry studies may be done in the study area if the results will significantly benefit the Monitoring and Adaptive Management Program for the California red-legged frog. Radiotelemetry could be used to determine how breeding populations from several ponds or streams interact and if breeding red-legged frogs move between ponds during or between breeding seasons. Finally, there is some speculation that creating new pond habitat is a good method for increasing the red-legged frog population in a given area but that there may be little or no interaction between pond-breeding frogs and stream-breeding frogs (S. Bobzien pers. comm.). Monitoring adults using radiotelemetry would help determine whether red-legged frogs are using stream, pond, and wetland habitat within the Reserve System, or if they are more selective in their habitat use. Once conceptual models for red-legged frog have been developed, implementation of these studies will be prioritized on the basis of data gaps identified and the information needed to more effectively manage frogs in the study area.

Additional habitat enhancements, such as changes in flow regimes, could be implemented in streams that support California red-legged frog habitat. Monitoring how these changes affect habitat quality and different life stages of development will be important.

Evaluate Use of Adjacent Uplands and Nonbreeding Aquatic Habitats

Monitoring habitat condition will occur in upland areas and nonbreeding stream habitats adjacent to occupied breeding habitat. Monitoring of upland habitat will also occur adjacent to unoccupied breeding habitat that is being actively managed for California red-legged frogs. Although unoccupied breeding habitat may not be the result of deficiencies in upland habitat, problems in upland habitat may contribute to lack of breeding, and monitoring will help identify threats. Due to the importance of both breeding and upland habitat to the success of this species, this information will be used to determine what the limiting biological factors are for unoccupied breeding habitat.

In general, changes in breeding populations over time will be correlated with land management in surrounding upland areas. Monitoring for changes in breeding success will help determine how those management techniques are affecting the population. For example, if prescribed burning, or mowing to mimic burning, is instituted in uplands surrounding California red-legged frog breeding habitat, and the population increases in that breeding pool over time, then some of that success might be attributable to the upland management techniques. In addition, monitoring the response of ground squirrel colony size and burrow density to upland management techniques will be used as a proxy to determine the quality and quantity of upland habitat available for California red-legged frogs. The response of riverine populations of red-legged frogs will be

monitored with respect to changes in riparian vegetation and corridor widths as the result of enhancement or restoration activities that occur under this Plan.

Evaluate Response of Predator Control Programs

During baseline surveys to document the status of covered species populations, breeding habitat occupied by nonnative species will be identified. These data will inform management actions within the Reserve System. Subsequent surveys for bullfrogs and predatory fish will be conducted to determine the effectiveness of eradication efforts. Threat-eradication efforts for California red-legged frog will focus on reducing or eliminating bullfrogs and predatory fish as the primary threats to tadpole persistence (Lawler et al. 1999). Post-treatment surveys will also allow for an assessment of the response of native amphibian populations to invasive species eradication.

Monitor Additional Threats

Monitoring will be conducted for diseases including chytrid fungus and any other harmful diseases that are discovered in the Reserve System during implementation. This monitoring will include assessing the effectiveness of any disease-control measures. Spreading of these diseases becomes a concern when biologists access more than one breeding site in a short period of time. Biologists will utilize accepted antiseptic protocols during all aquatic survey work to minimize the potential for cross-contamination.

Western Burrowing Owl (Group 1)

Document and Monitor Species Status

The Implementing Entity will carry out two separate survey efforts in support of the burrowing owl conservation strategy—nest surveys and population surveys.

Nest Surveys

Each year, the Implementing Entity will coordinate with survey efforts conducted at known nesting sites in the permit area including surveys conducted at San José International Airport, Moffett Federal Airfield, Shoreline at Mountain View, VTA Cerone bus maintenance yard, and San Jose/Santa Clara Water Pollution Control Plant buffer lands. Additional locations will be surveyed in subsequent years as new colonies are formed or discovered over the permit term. The Implementing Entity will coordinate with survey staff at the first three locations to obtain data from ongoing annual survey efforts and will provide guidance on the survey information required to inform regional data collection. The Implementing Entity will be responsible for conducting surveys at the last two locations (and any new colonies that may be discovered during the permit term) and will use the same methodology across sites to ensure consistency. All surveys will be conducted consistent with California Burrowing Owl Consortium

methodology (California Burrowing Owl Consortium 1993). Data collected from the annual survey sites will be used to track the number of adult burrowing owls and to assess reproductive status. Information will contribute to a rolling population viability analysis in the region. Collectively, the data will inform the adaptive management of this species and will help prioritize use of funds for burrowing owl conservation under the Plan. The first annual survey will occur during the first full year of Plan implementation and each year thereafter.

Population Survey

The Implementing Entity will also coordinate with other South Bay local governments, special districts, and non-profit organizations every 3 years to assess status of the burrowing owl population in the study area and the expanded study area for burrowing owl conservation. These survey efforts are aimed at identifying occupied and potential burrowing owl habitat in the four burrowing owl conservation regions. The focus of this larger survey effort is to document population expansion into new areas. This 3-year survey will help determine whether the range of nesting burrowing owls in the study area and expanded study area for burrowing owl conservation is stable and, possibly, expanding. Analysis of the survey results will encompass the areas surveyed annually, areas with historical or recent occurrences of nesting burrowing owls, and areas with highly suitable habitat that has not been occupied in the past. The initial population survey, which will occur during the first full year of implementation, will build on information collected on burrowing owl nest locations during the Habitat Plan planning process (Barclay 2008).

Evaluate Species Response to Habitat Protection and Enhancement

Monitoring the response of the western burrowing owl population to prescribed management will be difficult because population numbers are very low and the site fidelity of nesting owls is largely unknown in the study area and expanded study area. To gain a comprehensive understanding of how the population and individual nesting pairs respond to management actions, multiple approaches will be used. By establishing periodic surveys of available nesting and potential nesting habitat, a more precise estimate of the number of nesting pairs in lands protected and/or managed for burrowing owls will be made. The number of nesting pairs in the study area and expanded study area can then be tracked over time to determine whether the numbers change as more habitat is managed for burrowing owls. Where burrowing owls occur on lands managed under the Plan, the response of individual nesting pairs will be tracked to determine how management activities affect productivity. For example, if there is an area where burrowing owls are known to nest and grazing is introduced to stimulate grassland diversity, the productivity of those nesting owls will be tracked to determine if grazing has an effect on the owls' propensity to return to the site each year and the number of young produced over time.

In many cases the density and distribution of California ground squirrels and grassland height will be used as a proxy for assessing the quality and quantity of burrowing owl habitat within the burrowing owl management areas. Baseline

surveys to establish habitat condition, including the distribution and burrow density of California ground squirrels in management areas, will be conducted. The results of these surveys will be used to update the burrowing owl habitat model. An increase in the distribution of California ground squirrels in modeled habitat in response to management actions will be considered an increase in habitat availability for western burrowing owl. Overall success of efforts to promote burrowing owl will be measured by a positive growth rate in the PVA for this species (based on annual increases in the number of adults owls), and by the number of acres managed for burrowing owls.

In areas where California ground squirrels are not present and are unlikely to be reestablished, artificial burrow complexes may be installed to create nesting habitat. These installations will be monitored in accordance with accepted CDFG protocol to determine if they are supporting nesting owls.

Additional monitoring will be required if a program to increase reproductive success of burrowing owls in the South Bay are implemented (Tier 3 conservation actions, **Appendix M**). General success criteria will be defined in close coordination with the Wildlife Agencies. Criteria will be set during the Tier 2 surveys, and based on the success or failure of the program, interim checkpoints will be established to determined if/when the program should cease. Monitoring will include the evaluation of a pilot reintroduction program and a pilot study to determine other methods to increase reproduction of local burrowing owls. Success and the feasibility of replicating the reintroduction program at additional locations, as well as the effectiveness of methods to increase reproduction, will be evaluated.

Monitor Additional Threats

Rapid changes in grassland habitat, such as natural or prescribed burns, could have a temporary effect on burrow availability and prey availability for western burrowing owls. To determine how burrow availability is affected, California ground squirrel colonies will be monitored before and after natural or prescribed fires within managed areas. By monitoring the recovery period for grassland habitat, including variables such as size of the reestablished ground squirrel colony, overall habitat quality and quantity can be assessed.

California Tiger Salamander (Group 1)

Document and Monitor Species Status

During the breeding season, which begins soon after the first cool rains of late-fall and early winter, adult California tiger salamanders migrate to breeding pools. Before hatching and after larvae hatch out and are developing, the probability of detecting presence is highest. Surveys will be conducted during the breeding season using the most recent methodologies that are accepted by USFWS and CDFG. Monitoring actions that take place under the Plan will be

coordinated with those of other local agencies to ensure that unnecessary redundancies are eliminated and that data can inform both processes (e.g., Santa Clara Valley Water District 2005).

During the non-breeding season, when individuals are underground in upland refugia, this species is more difficult to detect and methods to do so are often cost prohibitive. To determine quality and quantity of upland habitat for this species, surveys for California ground squirrel colonies and pocket gopher activity will serve as a surrogate. This is discussed further below. In general, it will be assumed that if upland habitat is suitable and within the range of known dispersal distances from an observed breeding location, then the upland habitat is assumed to be occupied as well. Densities of adult salamanders using upland habitat in a given area will be extrapolated from densities of adult and larval salamanders detected in breeding habitat through seining or other methods.

Surveys of potential breeding habitat in lands acquired for the Reserve System will be conducted according to the survey schedule outlined above. Once it is established that potential breeding adults are present, a more in-depth survey during the breeding season, based on approved methodologies, will be conducted to determine an estimate of the size of the breeding population and an estimate of breeding success. Potential breeding habitat is defined as seasonal and some perennial wetlands, including stock ponds. Some riparian areas within stream corridors could also support breeding tiger salamanders if there are adjacent wetlands or large, slow water areas (e.g., side channels or scour pools) and no predatory fish species. This information will be used to document baseline levels for population monitoring during the permit term and beyond in areas where repeatable testing is appropriate. Baseline information will comprise the following.

- Ponds/wetlands occupied by tiger salamander larvae and/or breeding adults.
- Adult, larva, and egg mass numbers.
- Unoccupied breeding habitat that may have the potential to support breeding populations. This item will include an evaluation of the possible factors hindering successful breeding at that location.
- Assessment of upland habitat around occupied and potential breeding habitat.
- Presence of bullfrogs and predatory fish species in occupied or potential habitat.
- Signs suggesting presence of non-native salamander alleles (hybrid adults, paedamorphs).
- Presence of other factors (threats) that appear to affect breeding success at a given location where breeding is occurring.
- Estimate of the distance between known or potential breeding sites to help guide creation or enhancement of more robust populations.

This information will be documented in GIS layers and will be used to prioritize areas for enhancement/restoration. The management actions for target upland areas surrounding breeding habitat will also be described.

In years following baseline data collection, monitoring California tiger salamander population will take place during each breeding season at the survey frequencies described above in the introduction to Section 7.3.3 *Species-Level Actions*. Larval salamander numbers in select breeding pools will be used to determine the local population of salamanders, within the known dispersal distance from the breeding pool and will contribute to an overall population status and trends assessment across the Reserve System. The breeding pools that will be monitored within each Reserve Management Area will be outlined in its associated reserve unit management plan along with monitoring guidelines and population targets.

Additionally, upland habitat condition and use will be monitored during the breeding season within 0.5 mile of a representative sample of known breeding pools (Trenham and Shaffer 2005). Evaluation of upland habitat condition will be based on best available scientific information at the time. Changes in salamander numbers in breeding pools will be correlated with surrounding land uses. For example, if grazing is implemented as a management activity in an area where grazing previously did not occur, the impact that this has on habitat quality for tiger salamanders will be discerned by determining how it affects the breeding activity at known breeding ponds in the area.

Monitoring protocols will be developed to assist the Implementing Entity in demonstrating compliance with species occupancy requirements described in Chapter 5, Section 5.3.1, subheading *Acquisition of Modeled Habitat for Covered Species*.

Evaluate Covered Species Response to Habitat Enhancement, Restoration, or Creation

Ponds or wetlands that are targeted for restoration, enhancement, or creation will be monitored to determine the response of breeding tiger salamanders to habitat management. Management activities will be correlated with population numbers, and the relative success of different techniques on maintaining or increasing tiger salamander populations will be assessed to guide future management efforts. Newly created ponds and enhanced or restored wetlands and ponds will be monitored for target species response, including presence/absence surveys for tiger salamander larvae and breeding adults.

In addition, upland areas near created, enhanced, or restored breeding habitat will be surveyed for habitat suitability. While surveying for the presence of individuals can be cumbersome (e.g., scoping or excavating ground squirrel burrows) and time consuming, determining accessibility of upland habitat from breeding ponds and its suitability for non-breeding season use is a simpler undertaking. Surveyors will determine whether there are any barriers between breeding habitat and upland sites. Surveyors will also determine if there are sufficient underground refugia available for tiger salamanders during the non-breeding season. Changes in this upland habitat availability and suitability will be correlated with breeding population numbers. For example, if the size of a ground squirrel colony is reduced following a prescribed burn and the next year

the California tiger salamander breeding population is substantially reduced, then it might be inferred that prescribed burning had a negative effect on the tiger salamander population during this brief window.

Similarly, if the vegetative communities surrounding breeding habitat change due to restoration or enhancement (e.g., oak woodland planting, burning, grazing, tree thinning), the impacts on the breeding tiger salamander population will be tracked and its relationship with the management in these upland areas will be inferred. In select instances, directed studies might be developed to better understand how complex management issues influence tiger salamander populations over time.

Evaluate Use of Burrows

Monitoring habitat conditions will occur in upland areas adjacent to a representative sample of occupied breeding habitat. Monitoring of upland habitat will also occur adjacent to unoccupied breeding habitat that is being actively managed for California tiger salamander. Due to the importance of both breeding and upland habitat to the success of this species, this information will be used to determine what the limiting biological factors are for unoccupied breeding habitat. Monitoring the size and burrow density of ground squirrel colonies adjacent to breeding habitat will be essential. Monitoring the response of ground squirrel colony size and burrow density to upland management techniques will be used as a proxy to determine the quality and quantity of upland habitat available for California tiger salamanders.

To develop more detailed information on how California tiger salamanders use underground refugia in upland habitat, burrows and other refugia on the Reserve System can be surveyed using a burrow probe (also known as a “digiscope”). This tool provides the means to confirm or deny occupancy of burrows in upland areas, though this method is not very cost effective for a large Reserve System. Rather, this technique can be used periodically to test the assumptions about upland habitat quality characteristics. In general, it will be assumed that if breeding habitat is occupied then adjacent uplands within typical dispersal distance are being utilized as well.

Evaluate Response of Predator Control Programs

During baseline surveys to document the status of native species populations, a description of breeding habitat that is occupied by bullfrogs and predatory fish species will also be completed. These data will inform management actions within the Reserve System. Subsequent surveys for bullfrogs and predatory fish will be conducted to determine the effectiveness of eradication efforts. This will also allow for an assessment of the response of native amphibian populations to nonnative species eradication efforts.

Monitor Additional Threats

Monitoring will be conducted for diseases including chytrid fungus and any other harmful diseases that are discovered in the Reserve System during implementation. This monitoring will include assessing the effectiveness of any disease-control measures. Spread of these diseases becomes a concern when biologists access more than one breeding site in a short period of time. Biologists will utilize accepted antiseptic protocols during all aquatic survey work to minimize the potential for cross-contamination.

Nonnative salamanders are known to occur in the study area and are hybridizing with California tiger salamanders covered under this Plan. The degree of hybridization however, varies greatly within the Plan Area. As described in Chapter 5 and **Appendix K**, the management strategy for hybrid salamanders will be incorporated into the reserve unit management plans developed for portions of the Reserve where nonnative tiger salamanders and/or suspected hybrids are detected. Adaptive management involving close coordination with USFWS, CDFG, and other species experts will be critical in addressing this threat during Plan implementation. At a minimum, location, population size, and general condition of nonnative and suspected hybrid populations of salamanders will be documented. The response of native salamanders (e.g., outcompetition, hybridization) will also be monitored closely along with population response to any management actions that are implemented in accordance with the hybridization plan described in Chapter 5 and **Appendix K**.

Tiburon Indian Paintbrush (Group 1)

Document and Monitor Species Status

The Kirby Canyon Butterfly Trust closely monitors both known populations of Tiburon Indian paintbrush in the study area. These data will be used as baseline population data for this species. Plant surveys on acquired parcels will be conducted to document new populations.

Tiburon Indian paintbrush status will be monitored over time in relation to baseline population sizes; baseline data will serve as the standard against which future changes are measured. Monitoring will evaluate changes over time and the response of plant populations to management activities. Monitoring will include data on population size, numbers and location; age classes; seedling survival and health and vigor of populations. Location data will be collected by GPS and documented in GIS layers. In addition to annual monitoring, monitoring will always be conducted following events that may have strong effects on population size and condition (e.g., fire, severe weather, human impact). Monitoring methods will be based on up-to-date, repeatable methods of tracking population status over time.

Evaluate Covered Species Response to Habitat Enhancement

Monitoring the response of Tiburon Indian paintbrush to various grazing regimes is already occurring in the study area. This monitoring will continue under the Plan, especially if new management techniques are introduced as a result of Plan implementation. Monitoring surveys will follow appropriate protocols and occur during the flowering period for this species, which is typically April–July. In addition to acquiring data on the target population, studies may be carried out to document changes in grassland communities in and around known populations of Tiburon Indian paintbrush. Changes in plant status will be correlated to changes in the management regime to help determine whether management actions have successfully created opportunities for the population to grow.

Targeted Studies

A goal of targeted studies initiated under the Plan will be to identify any factors that are limiting population expansion of Tiburon Indian paintbrush. For example, land use patterns around known populations could be reducing habitat quality and restricting population expansion. If these land use patterns are correlated with population isolation, or if any other factors are shown to be limiting population growth, then management actions will be prescribed and implemented to change those land use patterns or factors to promote natural population expansion. Monitoring the response of plant populations to those actions will inform future management of these two very important sites.

An additional management action that is prescribed for Tiburon Indian paintbrush is experimental grazing exclusion. When such projects are implemented, appropriate monitoring protocols will be developed to study the population response.

Monitor Additional Threats

The Kirby Canyon Butterfly Trust is currently assessing the effectiveness of excluding feral pigs from areas where known Tiburon Indian paintbrush populations exist. Feral pig rooting is considered a threat to plant populations, although it is also possible that such disturbance could be beneficial if properly managed. It is uncertain if replicated experiments will be possible to determine the most effective balance of disturbance from feral pigs because Tiburon Indian paintbrush population numbers are low. However, monitoring will measure population response to pig-removal efforts, and decisions about long-term exclusion of pigs from these sites will be based on those results.

Rapid changes in grassland habitat, such as fire, could have an effect on grassland species. Tiburon Indian paintbrush populations will be monitored before and after fires, should they occur. By monitoring the post-fire recovery of grassland habitat, which might include variables such as percentage of

reestablished native versus nonnative grassland, an assessment can be made about overall quality of habitat and whether permanent changes in grassland habitat will affect the persistence of Tiburon Indian paintbrush populations.

Coyote Ceanothus (Group 1)

Document and Monitor Species Status

The location and geographic extent of the three known occurrences of coyote ceanothus are well documented within the study area from field observations and air photos (it is the only covered species visible on air photos due to its distinctive color signature). However, data on occurrence size and demography are limited because portions of all three occurrences occur on private land. These three occurrences will be added to the Reserve System and baseline occurrence assessments will be made at that time. The response of each occurrence to management under this Plan will be measured against those baseline occurrence levels. Survey protocols for the species will need to be developed. Occurrence size surveys may include complete counts for small occurrences or statistical sampling and analysis for larger occurrences. All surveys that are conducted will be coordinated with any ongoing survey efforts (e.g., Santa Clara Valley Water District 2005).

Coyote ceanothus status will be monitored over time in relation to baseline occurrence sizes; baseline data will serve as the standard against which future changes are measured. Monitoring will evaluate changes over time and the response of plant occurrences to management activities. Monitoring will include data on occurrence size, numbers and location; age classes; seedling survival and health and vigor of occurrences. Location data will be collected by GPS and documented in GIS layers. Monitoring surveys will occur at frequency intervals described above in the introduction to Section 7.3.3 *Species-Level Actions*. In addition to annual monitoring, monitoring will always be conducted following events that may have strong effects on occurrence size and condition (e.g., fire, severe weather, human impact). Monitoring methods will be based on up-to-date, repeatable methods of tracking occurrence status over time.

Evaluate Covered Species Response to Habitat Enhancement

There may be little grazing pressure on any of the three occurrences due to exclusion fencing, although native herbivores such as deer may browse seedlings. However, if different grazing regimes or other management techniques are employed in these areas, the effects of those techniques on each occurrence will be determined by conducting appropriate monitoring surveys. These surveys will include quantifying how these management regimes change natural communities that surround known occurrences. Recruitment of seedlings will be tracked to determine which management techniques are most effective at increasing occurrence levels.

Targeted Studies

A goal of monitoring under the Plan is to identify factors that limit coyote ceanothus expansion. Management actions will then be prescribed to remove or reduce those limitations; this process will be adaptively managed through follow-up occurrence surveys.

New occurrences of Coyote ceanothus will be created using field experiments to investigate suitable propagation or planting techniques and determine appropriate seed-sampling techniques from existing occurrences. These targeted studies will be experimental, and the impact that they have on known occurrences will be monitored (i.e., the effects of using existing occurrences as a seed stock for new occurrences).

All created occurrences will be monitored with appropriate protocols to measure establishment success and determine whether this technique is a viable management option. The outcomes of these targeted studies will be used in adaptive management decisions and to inform conservation actions for this species.

Additional targeted studies will be conducted to examine the effects of prescribed burns on coyote ceanothus occurrences. In the past, observers have noted increased recruitment following fires. The goal of experimental burning under this Plan is to determine the importance of fire on plant regeneration and to identify the most effective fire regime for increasing the size of occurrences. Monitoring occurrence response to experimental burning will inform future management action for this species.

Monitor Additional Threats

If any natural fires occur in areas of coyote ceanothus occurrences, then the occurrences will be monitored to study how the occurrence and species respond. Specific protocols will be developed in the context of the fire and how it has affected the plant occurrence.

Santa Clara Valley Dudleya (Group 1)

Document and Monitor Species Status

Although many occurrences of Santa Clara Valley dudleya are well documented in the study area, baseline occurrence surveys will be conducted on modeled habitat in the Reserve System to quantify or estimate the number of individuals in known occurrences and to determine if undiscovered occurrences occur on the property. Because this perennial species is readily identifiable at all times of year, surveys can be conducted at any time. Many of the known occurrences occur on private lands. If these areas are added to the Reserve System, baseline occurrence assessments will be made at that time so that the response of each

occurrence to management can be measured against those baseline occurrence levels. Baseline monitoring is currently being conducted for this species in permanent plots on Coyote Ridge on the UTC parcel (Arcadis 2008).

One key question that will be addressed early in monitoring implementation is the maximum spacing distance for individuals within the same occurrence. Santa Clara Valley dudleya individuals are patchily distributed, clustering on discrete rock outcrops. It is likely that plant interactions decrease with increasing distance from rock-outcrop patches. Occurrences are not likely to be discrete entities but rather a continuum of sub-occurrences. However, an operational "boundary" needs to be defined to delineate occurrences for monitoring and management purposes.

Monitoring will evaluate changes over time and the response of plant occurrences to management activities. Monitoring will include data on occurrence size, numbers and location; age classes; seedling survival and health and vigor of occurrences. Location data will be collected by GPS and documented in GIS layers. In addition to annual monitoring, monitoring will always be conducted following events that may have strong effects on occurrence size and condition (e.g., fire, severe weather, human impact). Monitoring methods will be based on up-to-date repeatable methods of tracking occurrence status over time.

Evaluate Covered Species Response to Habitat Enhancement

The effect of grazing regimes or other management techniques on each occurrence of Santa Clara Valley dudleya will be monitored by conducting surveys according to the same protocols established in baseline surveys. Monitoring studies may also include protocols to quantify how management techniques affect the serpentine grassland habitat that surrounds known occurrence or to assess if these techniques have an effect on Santa Clara Valley dudleya individuals or occurrence.

Targeted Studies

A goal of monitoring under the Plan is to identify factors that limit the expansion of Santa Clara Valley dudleya occurrences. Management actions will then be prescribed to remove or reduce those limitations; this process will be adaptively managed through follow-up occurrence surveys.

Monitor Additional Threats

Grazing by native species (e.g., Tule elk) and livestock is thought to be a threat to Santa Clara Valley dudleya, however the actual threat posed by grazing has not been documented. As serpentine grassland management is implemented, a

replicated experiment design will be used to determine to what extent and by what mechanism(s) livestock grazing affects known occurrences. These studies will also aim to determine the level of protection from grazers that this species needs to remain viable. Such studies will include a grazing exclusion component.

Rapid changes in grassland habitat, such as natural or prescribed burns, could have an effect on grassland species such as this. Santa Clara Valley dudleya occurrences will be monitored before and after fires occur. By monitoring the recovery period for grassland habitat, as well as other variables (e.g., percent native versus nonnative grassland that reestablishes), an assessment can be made about overall habitat quality and whether permanent changes in grassland habitat will affect the persistence of these occurrences.

Metcalf Canyon Jewelflower (Group 1)

Document and Monitor Species Status

Baseline occurrence surveys will be conducted on modeled habitats in the Reserve System to quantify or estimate the number of individuals in known occurrences and to determine if undiscovered occurrences occur on the property. Most of the known occurrences of Metcalf Canyon jewelflower occur on private lands. If these areas are added to the Reserve System, then baseline occurrence assessments will be made at the time of acquisition to assess occurrence levels. Thereafter, the response of each occurrence to management can be measured against those baseline levels. Baseline monitoring is currently being conducted for this species in permanent plots on Coyote Ridge on the UTC parcel (Arcadis 2008).

Monitoring of Metcalf Canyon jewelflower will occur during its flowering period, between April and July, and surveys will occur only when the plants are actually flowering in order to assure recognition. Monitoring will evaluate changes over time and the response of plant occurrences to management activities. Monitoring will include data on occurrence size, numbers and location; age classes; seedling survival and health and vigor of occurrences. Location data will be collected by GPS and documented in GIS layers. In addition to annual monitoring, monitoring will always be conducted following events that may have strong effects on occurrence size and condition (e.g., fire, severe weather, human impact). Monitoring methods will be based on up-to-date repeatable methods of tracking occurrence status over time.

Evaluate Covered Species Response to Habitat Enhancement

The effect of grazing regimes or other management techniques on each occurrence of Metcalf Canyon jewelflower will be monitored by conducting surveys according to the same protocols established in baseline surveys.

Monitoring studies may also include protocols to quantify how management techniques affect the serpentine rock outcrops on which the species grows and/or to assess if these techniques have an effect Metcalf Canyon jewelflower individuals or occurrences.

Targeted Studies

A goal of monitoring under the Plan is to develop studies that identify factors limiting the expansion of Metcalf Canyon jewelflower occurrences. Management actions will then be prescribed to remove or reduce those limitations; this process will be adaptively managed through follow-up surveys.

New occurrences of Metcalf Canyon jewelflower will be created using field experiments to investigate suitable propagation or planting techniques and determine appropriate seed-sampling techniques from existing occurrences. These targeted studies will be experimental, and the impact that they have on known occurrences will be monitored (i.e., the effects of using existing occurrences as a seed stock for new occurrences). The micro-habitat of this species is serpentine rock outcrops, particularly steeply cut rock faces such as those found in roadcuts, and this habitat may be experimentally created and seeded.

All created occurrences will be monitored with appropriate protocols to measure establishment success to determine whether this technique is a viable management option. The outcomes of these targeted studies will be used in adaptive management decisions and to inform conservation actions for this species.

Metcalf Canyon jewelflower is known to interbreed with its close relative, also a covered plant species—most beautiful jewelflower. There is concern that Metcalf Canyon jewelflower could eventually lose its distinct genetic integrity (Weiss and Wright 2005). Targeted studies will be undertaken to monitor this introgression and develop protocols to protect the genetic integrity of both species.

Monitor Additional Threats

Grazing by native species and livestock may to be a threat to Metcalf Canyon jewelflower. As serpentine grassland management is implemented, a replicated experimental design will be used to determine how livestock grazing affects known occurrences. These studies will also aim to determine the level of protection from grazers that this species needs to remain viable. Such studies will include a grazing-exclusion component.

Rapid changes in grassland habitat, such as natural or prescribed burns, could have an effect on Metcalf Canyon jewelflower since it generally grows in outcrops and roadcuts within a larger grassland matrix. Occurrences will be

monitored before and after prescribed burns, and after any natural fires. By monitoring the recovery period for grassland habitat, as well as other variables (e.g., percent native versus nonnative grassland that reestablishes), an assessment can be made about overall habitat quality and whether permanent changes in grassland habitat will affect the persistence of these occurrences.

Foothill Yellow-Legged Frog (Group 2)

Document and Monitor Species Status

Foothill yellow-legged frogs can be observed year-round in perennial streams. Observing adult foothill yellow-legged frogs is difficult, but possible. Surveys could be conducted throughout the breeding period (April–July), though the probability of detection is generally higher June–July.

During the breeding season, adults, juveniles, and tadpoles could be present in suitable streams, offering the greatest opportunity for detection. Surveys for adults will only be used to determine population levels if multiple surveys are conducted at a given site, all life stages have been counted, and survey coverage is near 100%. Otherwise, these visual detection surveys will only serve to determine presence/absence of the species along a given stream reach.

In most cases, the reproductive output of the population will be measured by counting egg masses in potential breeding habitat. The number of egg masses will be used to determine the relative number of breeding females in a given reach, as well as estimates of overall population health. Observing foothill yellow-legged frog adults or juveniles is difficult and could prove an inadequate method to determining relative population levels along a stream reach. However, all incidental sitings of adults, juveniles, or larvae will be recorded during each egg mass survey. Surveys for foothill yellow-legged frog egg masses will be conducted in known or assumed habitat both within the Reserve System and along stream courses that are outside of the Reserve System but where access has been granted to one of the Implementing Partners. Surveys will be conducted using the best available protocol for this species (e.g., Seltenrich and Pool 2002).

Foothill yellow-legged frogs typically lay most of their eggs during April (Bobzien and DiDonato 2007). This generally coincides with the end of the last high-water period in stream corridors. However, if large storm events occur during April, foothill yellow-legged frogs can delay egg laying to reduce mortality of egg masses from unseasonable high water (S. Bobzien pers. comm.). If there are unusually late storm events, surveys during that year will be shifted to maximize detection of egg masses.

Surveys of potential foothill yellow-legged frog habitat on land acquired for the Reserve System will be conducted according to the survey schedule outlined above. This information will be used to document baseline levels for population monitoring during the permit term and beyond. The baseline surveys will document the characteristics listed below.

- Stream reaches occupied by foothill yellow-legged frog adults.
- Unoccupied breeding habitat with the potential to support breeding populations (typically upstream or downstream of occupied habitat).
- Assessment of riparian vegetation and stream substrate along occupied and unoccupied stream reaches.
- Presence of nonnative bullfrogs, crayfish, or nonnative, predatory fish species in occupied or unoccupied habitat.
- Presence of other factors (threats) seemingly affecting breeding success at a given location.

This information will be documented in GIS layers and used to prioritize areas for protection and enhancement/restoration. This process will be used to determine the potential for unoccupied breeding habitat to be enhanced or restored to support breeding adults in the future. It will also inform how proposed restoration or enhancement of riparian corridors and streams might affect foothill yellow-legged frog breeding sites.

Monitoring protocols will be developed to assist the Implementing Entity in demonstrating compliance with species occupancy requirements described in Chapter 5, Section 5.3.1, subheading *Acquisition of Modeled Habitat for Covered Species*.

Evaluate Covered Species Response to Flow Regulation

Changes in flow downstream of dams could affect remnant populations of foothill yellow-legged frogs in the permit area. Flows could also change as a result of dewatering events described in Chapter 2 *Land Use and Covered Activities*. If yellow-legged frog populations are found in streams hydrologically affected by existing dams in the permit area, the Implementing Entity will monitor the effects of flow regulation on the species.

Evaluate Species Response to Enhancement and Restoration of Stream Habitat

Stream reaches that are targeted for restoration or enhancement will be monitored to determine the response of breeding foothill yellow-legged frogs. The relative success of different techniques for maintaining or increasing foothill yellow-legged frog populations will be assessed to guide future management efforts. Enhancement or restoration of occupied breeding habitat will be monitored by determining changes in the number of egg masses detected during surveys to establish estimates of reproductive output. Surveys will be conducted at the frequencies discussed above.

Ideally, egg mass surveys will be conducted once a week during the peak egg-laying period (Bobzien and DiDonato 2007). Peak egg-laying periods within the

study area will be determined by surveying early in the known breeding period and ending the surveys at the end of the known breeding period or after no new egg masses have been observed, whichever comes last. Survey periods must be flexible to adjust for climate-induced impacts to egg-laying period (e.g., warm, low moisture winter may delay the egg mass laying in April and move it into May.) April has been noted as the peak egg-laying period for foothill yellow-legged frogs in nearby Alameda and Contra Costa Counties (Bobzien and DiDonato 2007). The overall reproductive output (i.e., number of egg masses) will be recorded during the survey period, and each egg mass will be recorded with a handheld GPS unit. This will allow for follow-up surveys of breeding sites in subsequent years.

Additional habitat enhancements, such as changes in flow regimes, could be implemented in streams that support foothill yellow-legged frog habitat. Monitoring how these changes affect habitat quality and different life stages of development will be important.

Evaluate Management of Riparian Corridors

When enhancement or restoration activities are conducted in riparian areas, foothill yellow-legged frog populations will be monitored to determine how changes in riparian vegetation affect the local breeding population. That information will be used to inform future management actions along stream reaches that are occupied by foothill yellow-legged frogs. For example, if trees are removed to open up the canopy of a riparian corridor to promote growth in the understory for early successional songbird species, the response of the yellow-legged frog population along that reach would be of interest. Similarly, riparian restoration that promotes overstory vegetation and subsequently cools target reaches will be monitored for foothill yellow-legged frog response.

In some streams, alternate, off-stream water sources will be provided for livestock to discourage them from entering the stream. Where necessary, fencing will be installed to exclude livestock from particularly sensitive reaches. The foothill yellow-legged frog population and reproductive output will be monitored and compared to baseline conditions to determine if this method affects species response.

Evaluate Response to Nonnative Plant and Animal Control

During baseline surveys, a description of breeding habitat that is occupied by bullfrogs, crayfish, and predatory fish species will also be completed. These data will inform management actions within the Reserve System. Subsequent surveys for bullfrogs and predatory fish will be conducted to determine the effectiveness of eradication efforts. This will also allow for an assessment of the response of native amphibian populations to nonnative species eradication.

In addition, the removal of nonnative vegetation in riparian areas and reseeding with native vegetation may temporarily or permanently change the habitat adjacent to that used by foothill yellow-legged frogs. Population size will be estimated and reproductive output (i.e., number of egg masses) will be monitored along reaches that are restored or enhanced to determine if there are short-term (less than 5 years) or long-term (more than 5 years) effects. The results of this monitoring will inform vegetation management along corridors adjacent to foothill yellow-legged frog habitat.

Monitor Additional Threats

Monitoring will be conducted for diseases and the efficacy of disease control including chytrid fungus and any other harmful diseases that are discovered in the Reserve System during Plan implementation. Spread of these diseases becomes a concern when biologists access more than one breeding site in a short period of time. Biologists will utilize accepted antiseptic protocols during all aquatic surveys work to minimize the potential for cross-contamination.

Western Pond Turtle (Group 2)

Document and Monitor Species Status

Surveys of potential western pond turtle habitat in land acquired for the Reserve System will be conducted to select sites for monitoring and document baseline population levels. These sites will then be revisited and the population levels measured against the baseline to determine the effectiveness of management actions. Baseline surveys will entail an assessment of the characteristics listed below.

- Stream reaches, ponds, wetlands, or reservoirs occupied by western pond turtle adults.
- Unoccupied aquatic habitat with the potential to support populations (typically adjacent to occupied habitat).
- Basking sites that could be monitored repeatedly.
- Adjacent upland overwintering habitat for stream turtles (turtles using ponds remain in the water in winter).
- Adjacent upland nesting habitat, particularly in areas where nesting has been documented in the past.
- Presence of other factors (threats) seemingly affecting breeding success at a given location (e.g., adjacent land use).
- Observations on size structure of the population to ensure that young turtles are present and that successful reproduction is occurring.

This information will be documented in GIS layers and used to prioritize areas for enhancement and restoration. This process will be used to determine the

potential for unoccupied breeding habitat to be enhanced or restored to support western pond turtles in the future. It will also help predict how proposed restoration or enhancement of aquatic habitat and adjacent uplands might affect western pond turtle nest sites.

Western pond turtles can be observed year-round in perennial streams, ponds, and wetlands and on the fringes of reservoirs. Surveys will be conducted at times as early as March, in conjunction with surveys for stream populations of California red-legged frogs, but the highest probability of detection to determine presence of the species is during the summer months when individuals can be counted while basking during the middle of the day. Repeated annual surveys of basking sites will be used as an index for overall population numbers. This method will likely be more effective in ponds and wetlands, where aquatic habitat is well defined, than in streams or lakes where individuals are able to move greater distances through the water.

In many cases, it could be beneficial to install artificial basking sites in ponds or wetlands that would be monitored every year. This would facilitate monitoring in areas where there are no basking sites or where sites are submerged during high-water periods. In streams and along reservoir margins, existing information on species distribution and baseline survey data of suitable basking sites will provide an inventory of future survey sites. Once identified, these basking sites will be monitored at the frequencies described above in the introduction to Section 7.3.3 *Species-Level Actions* to determine the number of individuals present. These results will be used to determine the population level in the area and will allow for some analysis of population response to management actions.

Monitoring protocols will be developed to assist the Implementing Entity in demonstrating compliance with species occupancy requirements described in Chapter 5, Section 5.3.1, subheading *Acquisition of Modeled Habitat for Covered Species*.

Evaluate Covered Species Response to Flow Regulation

Flows could also change as a result of dewatering events described in Chapter 2 *Land Use and Covered Activities*. If western pond turtle populations are found in streams hydrologically affected by existing dams in the permit area, the Implementing Entity will monitor the effects of flow regulation on the species. Monitoring how these changes affect habitat quality and different life stages of development will be important.

Evaluate Species Response to Enhancement and Restoration of Aquatic Habitat

Stream reaches, ponds, and wetlands that are targeted for restoration or enhancement will be monitored to determine the response of western pond turtle populations to those activities. The relative success of different techniques for

maintaining or increasing western pond turtle populations will be assessed to guide future management efforts. Enhancement or restoration of occupied habitat will be monitored by determining changes in the average number of individuals observed during basking site surveys. This method will only be useful at monitoring long-term trends, but it will give some sense of the population response to the change in habitat.

In areas where nesting is known to occur, the number of nesting attempts or the success rate of nests will be monitored to determine how site-specific management prescription are affecting turtles during the nesting period. The opportunities to conduct this type of monitoring may be limited due to the number of known nesting areas and the difficult nature of monitoring nesting turtles without disturbing important nesting areas. The Implementing Entity will determine the best approach for monitoring western pond turtle once reserves are acquired and reserve unit management plans are being developed. Trapping or observations can provide information on the relative abundance of young (small) turtles as an index to reproductive success.

In some streams, alternate, off-stream water sources will be provided for livestock to discourage them from entering the stream. Some ponds will be partially fenced to exclude grazing and promote growth of emergent vegetation. Western pond turtle populations will be monitored and compared to baseline conditions to determine if these methods improve habitat quality and increase numbers of turtles.

Additional habitat enhancements, such as changes in flow regimes, may be implemented in streams that support western pond turtle habitat. Monitoring by the Implementing Entity regarding how these flows affect habitat quality will be important. Changes to riverine systems to conditions that are more natural will inherently benefit western pond turtles in the study area.

Monitor Additional Threats

Nesting sites and nest success are thought to be the limiting factor for this species in the study area. Identifying known or potential nest sites in the Reserve System and along target streams will provide valuable information that informs efforts to conserve the species. Studies have shown that while western pond turtle populations can seem relatively stable due to the presence of adults, there may be minimal recruitment of juveniles into the population (Reese 1996). Focusing on aquatic habitats is important, but extending that focus to include adjacent uplands, where nesting could occur, is critical to guaranteeing the long-term stability of the populations.

Other Covered Plants (Group 2)

There are 6 other rare plant species covered by this Plan. Their monitoring actions will be comparable and are described below. These plant species include the following:

- Mount Hamilton thistle
- Fragrant fritillary
- Loma Prieta hoita
- Smooth lessingia
- Most beautiful jewelflower

Document and Monitor Species Status

Baseline surveys will be conducted on parcels that are added to the Reserve System to determine or estimate the number of individuals in known occurrences of covered plants and whether undiscovered occurrences occur on the property. Surveys will be conducted at the appropriate blooming period for each species (see **Appendix D** for blooming periods). Survey protocols will be developed for each species. When feasible and efficient to do so, surveys for serpentine plants will be included with the above-described surveys for Bay checkerspot butterfly. Surveys may entail counts for small sub-occurrences or statistical sampling and analysis for larger occurrences. Baseline monitoring is currently being conducted for fragrant fritillary, most beautiful jewelflower, smooth lessingia, and Mount Hamilton thistle in permanent plots on Coyote Ridge on the UTC parcel (Arcadis 2008).

Species status will be monitored over time in relation to baseline occurrence sizes; baseline data will serve as the standard against which future changes are measured. Monitoring will evaluate changes over time and the response of plant occurrences to management activities. At a minimum, monitoring will include data on occurrence size, numbers and location; age classes; seedling survival; health and vigor of occurrences, threats, and adjacent land uses. Location data will be collected by GPS and documented in GIS layers.

For some species, it may be important to separate individuals into stages (e.g., seedlings, adults, reproductive adults) to assess occurrence dynamics. In addition to the specified monitoring, monitoring will always be conducted following events that may have strong effects on occurrence size and condition (e.g., fire, severe weather, human impact). Monitoring methods will be based on up-to-date repeatable methods of tracking occurrence status over time.

Evaluate Species Response to Habitat Enhancement

Several land management actions will be implemented under this Plan. In many areas these management activities are already occurring. For example, grazing is

an important part of grassland management in the study area. However, the manner in which reserve lands are grazed may change as the result of prescriptive management outlined in reserve unit management plans. In some areas, grazing may be reduced in favor of other management techniques such as prescribed fire.

In all such cases the impact of changes in management on covered plant occurrences will be tracked through occurrence monitoring. Management at the natural community level will be informed by information that is gathered during species-specific monitoring. Monitoring will be designed to facilitate quantification of how these management regimes change the number of individuals in an occurrence and/or the total number of occurrences. Additional data that could be collected to inform management decisions include the recruitment of seedlings in covered plant occurrences and changes in the species richness of natural communities surrounding covered plant occurrences. Ultimately, the findings of these monitoring activities should determine which management techniques are most effective at increasing covered plant occurrence levels in the Reserve System.

Targeted Studies

A goal of monitoring under the Plan is to identify factors that limit the expansions of covered plant occurrences. Management actions will then be prescribed to remove or reduce those limitations; this process will be adaptively managed through follow-up surveys.

For some species, targeted studies will be conducted to evaluate the efficacy of establishing new occurrences by transplanting individuals from known occurrences or by seed collection and propagation. These created occurrences will be monitored and their success, as well as any impact that transplantation or seed collection has on known occurrences, will be recorded and incorporated into adaptive management decisions. In addition, the success rate of establishing individuals in new locations will be tracked to determine if this is a viable management option. The outcomes of these studies will be used to inform conservation actions for these species.

The Plan also prescribes some management actions for specific species, such as conducting experimental grazing exclusion for a small suite of plants. In all cases of specific management action implementation, appropriate monitoring protocols will be developed and carried out.

Monitor Additional Threats

While fire is likely necessary for the propagation of some species, the effect of fire on covered species is not well understood at this time. Accordingly, covered plant occurrences will be monitored after fires. By monitoring the recovery period for natural communities that burn, as well as other variables such as

percent native versus nonnative species that reestablish, an assessment can be made of overall habitat quality and whether permanent changes in available habitat will affect the persistence of covered plant occurrences.

Mt. Hamilton thistle may face threats from the release of biological control agents (e.g., insect herbivores) that target related invasive thistles. If such releases are conducted in the study area, occurrences of Mt. Hamilton thistle on the Reserve System need to be monitored closely to determine whether there are any adverse effects on this covered species. However, initial monitoring does not show a significant effect on recruitment from biocontrol agents (Hillman 2007).

Additional monitoring may be necessary for covered plants (e.g., Loma Prieta hoita) that may be susceptible to feral pig rooting or damage by other invasive species. Covered plant occurrences near recreational trails will be monitored periodically for trampling or illegal collecting.

San Joaquin Kit Fox (Group 3)

Document and Monitor Species Status

Although state and federally listed, the San Joaquin kit fox is included in Group 3 because the study area is not considered a critical component of the species' range. Monitoring for San Joaquin kit fox will be difficult due to the very low numbers of individuals in the study area (or their absence in many years) and also to their presence primarily on private property. While some monitoring for kit fox will be conducted, as described below, most monitoring for this species will be conducted at the natural community level. For example, monitoring of grasslands, described above in the introduction to Section 7.3.3 *Species-Level Actions* will reveal how grassland communities are responding to grassland management under this Plan. Facilitating a net increase in native grassland communities within the Reserve System will provide more and better habitat for kit fox by increasing the prey base. Further, monitoring the connectivity of habitats within the study area through study of other more abundant species with similar long-distance dispersal behavior (e.g., coyote, bobcat, badger) will ultimately determine if the goal of increased habitat connectivity for kit fox has been achieved.

The San Joaquin kit fox *Level B Strategy* of the *Recovery Plan for Upland Species of the San Joaquin* identified a number of research needs to refine viability models and land-use optimization model (U.S. Fish and Wildlife Service 1998). In accordance with these research needs, a baseline survey of potential den sites will be conducted for modeled San Joaquin kit fox habitat (**Appendix D**) in the Reserve System. Potential den sites will be assessed for occupancy, and a schedule for follow-up monitoring will be established. Further, to assess how San Joaquin kit fox and other terrestrial species move across SR 152 (the most prominent barrier within the modeled San Joaquin kit fox habitat), a combination of trail cameras or track boards will be used at assumed crossing locations (e.g., bridges, culverts) to quantify wildlife corridor use. A

methods testing study will be conducted to identify methods for quantifying use of crossings by native species.

Evaluate Species Response to Habitat Enhancement

It is assumed that monitoring efforts aimed at quantifying grassland community enhancement and connectivity will be suitable to assess kit fox habitat quality. For example, if grassland enhancement efforts are deemed successful at increasing the amount of grassland and overall connectivity in the Reserve System, then those efforts will be similarly successful for grassland-dependent species such as San Joaquin kit fox. The density and distribution of California ground squirrels in the Reserve System will also be used as a proxy for habitat quality and quantity for San Joaquin kit fox within the modeled range of the species. Baseline surveys to establish the distribution and burrow density of California ground squirrels in the Reserve System will be conducted, and that information will be used to refine the habitat model. Changes in distribution of California ground squirrels in response to grassland management will be considered changes in habitat availability for San Joaquin kit fox in areas modeled as San Joaquin kit fox range.

The Implementing Entity will also monitor the success of conservation actions focusing on removing fences, roads, and/or small culverts to increase habitat linkage for the kit fox by tracking more common indicator species. Indicator species will also be monitored to track the efficacy of fencing installed to direct movement toward linkages that are created or enhanced through Plan implementation.

Monitor Additional Threats

Additional threats within the study area include SR 152, which bisects potential San Joaquin kit fox habitat. Other terrestrial mammals will be examined to evaluate how this and other roadways might be affecting habitat connectivity in the study area, because kit fox numbers are likely too low to reveal meaningful trends. How and where species move across these barriers and how those movement patterns change in response to crossing enhancement or roadway modifications will be assessed.

In addition, predation of nonnative red fox on San Joaquin kit fox will be examined as a threat.

Rapid changes in grassland habitat, such as natural or prescribed burns, could have a temporary effect on prey availability and cover for San Joaquin kit fox. To determine how the prey base is affected, California ground squirrel colonies will be monitored before and after fires occur. By monitoring the recovery period for grassland habitat, including ecosystem variables such as size of the reestablished ground squirrel colony, an assessment can be made of overall

habitat quality and whether permanent changes in grassland habitat will affect the occurrence or persistence of a San Joaquin kit fox population.

Least Bell's Vireo (Group 3)

Document and Monitor Species Status

Although state and federally listed, least Bell's vireo is included in Group 3 because the study area is not considered a critical component of the species' range. Surveys of riparian woodland within the Reserve System will be conducted. Initially, the Implementing Entity will document any nesting activity in the study area. Because least Bell's vireos have only been documented twice in the recent past (once nesting, once foraging), other songbird species (e.g., song sparrow, common yellowthroat, Wilson's warbler, black headed grosbeak) that nest in the understory of riparian woodland could be used as indicators of habitat quality until least Bell's vireos are documented nesting in the study area. The focus areas for least Bell's vireo will initially be the species' modeled habitat (**Appendix D**) within the Reserve System and on other public lands. Surveys along these stream reaches will characterize the songbird communities (also part of natural community monitoring) and detect any least Bell's vireos present during the nesting season. Species status will be based on presence in the Reserve System and other public lands. Monitoring will also occur at least every 5 years in targeted sites outside the vireo's modeled habitat in the study area to determine if it is expanding (in particular, in the northern portion of the County). These surveys would be done by the Implementing Entity. Through adaptive management, the vireo model would change in the future due to new information.

Surveys will consist of either standard point count or area search methods (Ralph et al. 1993) depending on the terrain and size of the reach. The nesting season for riparian songbirds is typically April 15–July 31 in the study area. The period with the highest potential to detect breeding least Bell's vireo is mid- to late May (Santa Clara Valley Audubon Society 2005). Locations of all singing males will be recorded using a GPS receiver, as will any nests or other evidence of breeding activity. During baseline surveys, the species habitat model will be modified to reflect riparian habitat quality and actual nesting habitat within the Reserve System. Subsequent surveys will be focused on those areas to monitor changes in the population.

Evaluate Species Response to Habitat Enhancement and Restoration

Additional surveys conducted by the Implementing Entity will be focused along riparian corridors where changes in land use or stream flow, or stream or riparian restoration activities, are expected to occur. For example, stream flow below the two south County reservoirs may be altered to improve habitat for covered aquatic species in Uvas Creek. Those alterations could change the riparian vegetation in Uvas or Llagas Creek, making it more or less suitable for breeding

least Bell's vireo. The actual effects will be determined by monitoring breeding least Bell's vireo populations along these stream reaches, should they be present or, in their absence, by monitoring breeding populations of other riparian understory obligates. Some modifications to land use, such as excluding livestock from stream corridors or stabilizing sources of sediment, could also change the vegetative structure along stream reaches. Monitoring least Bell's vireo and other riparian obligate songbird species will offer insight into how these changes affect the function of the riparian community.

In an extreme case, restoring engineered channels to a more natural condition will change the songbird community using the drainages during the nesting season. In such an instance it will be important to collect at least 1 year of baseline data along the engineered channel against which to compare the restored channel. However, few such scenarios are anticipated in potential least Bell's vireo habitat within the Reserve System (one example is Upper Llagas Creek within Morgan Hill).

Monitor Additional Threats

Currently there are limited threats to least Bell's vireo within the study area because populations are absent or very low. It is assumed that the distribution of the local population will continue to expand northward as it has in the recent past. Once a least Bell's vireo population is established in the study area, there could be additional threats to nests and adults. Studies to determine nest success will be conducted annually once nesting is detected in the study area. In addition to documenting nest success, these studies will document reasons for nest failure and incidence of brown-headed cowbird parasitism (a major threat in established populations in southern California). The results of these studies will inform management decisions to increase nest success in the study area. Potential management actions are listed below.

- Brown-headed cowbird control program.
- Feral cat removal or relocation.
- Native and/or nonnative predator control (e.g., red fox, raccoon, skunk).
- Restricted public access to important breeding areas during the nesting season.

Tricolored Blackbird (Group 3)

Document and Monitor Species Status

All suitable freshwater wetland or pond habitat within the Reserve System will be surveyed in accordance with the survey schedule described in the introduction to Section 7.3.3 *Species-Level Actions* to document the baseline estimate of the population size within the Reserve System. Because tricolored blackbird populations are rare in the study area, other potential wetland sites on other

public lands will be surveyed to document the species in the region. Baseline information for the species will comprise the components listed below.

- Location of occupied wetlands.
- Estimate of number of birds in colony.
- Assessment of nesting habitat quantity and quality (e.g., percent of native and nonnative plants).
- Assessment of any additional nearby threats (e.g., heron rookeries, sources of noise or other disturbance).

This information will be documented in GIS layers and used to prioritize areas for protection and enhancement or restoration/creation.

Once baseline data are collected, monitoring for tricolored blackbird colonies will be conducted during the breeding season. The population size of established colonies will be monitored, as will unoccupied wetlands in the study area. Tricolored blackbirds typically nest from early April through early June. Because the probability of detecting nesting colonies is highest during May, surveys will be conducted during or near the month of May. It is suggested that each colony be visited twice during the breeding season, preferably 10–14 days apart, to determine a range of breeding individuals at the colony, by at least two observers on the same day. The mean number of birds estimated by the two observers can be used to determine the size of the breeding colony. During the survey, the colony will be observed through binoculars or a spotting scope at a distance that will not change the behavior of the nesting birds. These proposed monitoring guidelines will be revised if better methodologies based on the best available scientific information are developed during implementation.

Once baseline data have been collected on breeding habitat availability in the Reserve System and existing breeding colonies have been documented, that information will be used to determine breeding habitat connectivity within the study area. This will identify areas where "new" breeding habitat will be created or acquired to ensure habitat connectivity for this species. Information will be collected on where new colonies become established, and identifying the surrounding land use patterns (e.g., agriculture, irrigated pasture) that provide foraging habitat for breeding tricolored blackbirds. Areas where this relationship can be preserved or created within the Reserve System will be identified and evaluated for future restoration or creation of habitat.

Evaluate Species Response to Habitat Enhancement, Restoration, or Creation

Enhanced or restored wetland areas and suitable created ponds will be monitored twice from April to June to determine if a tricolored blackbird nesting colony is present or, if one is already established, to document its current size. In wetlands or ponds where there are existing tricolored blackbird colonies, all enhancement or restoration activities will be conducted outside the nesting season. Following

those management actions, the tricolored blackbird colony size will be monitored to determine the population response to the management actions. In target areas where tricolored blackbirds were not observed prior to management actions, subsequent surveys will document whether new colonies establish in the area.

Monitor Additional Threats

In instances where tricolored blackbirds are nesting in nonnative plants (e.g., Himalayan blackberry), there is the risk that nonnative species control could result in the loss of nesting habitat. Accordingly, the removal of nonnative plant species will be weighed against the loss of important nesting habitat for this species. There should be attempts to transition the nonnative habitat to native habitat that will also support nesting tricolored blackbirds. The colony response to those actions will be monitored and the result will inform future management prescriptions for colony sites with nonnative plants.

In general it is difficult to monitor nest success of tricolored blackbird because while nesting they are very susceptible to disturbance. Some information about colony success can be gained through annual monitoring of colony size, but this approach often fails to identify specific stressors. There are assumptions that some species (e.g., feral cats) can have a deleterious effect on colonies. For colonies that are near urban areas, feral cat removal programs could increase the success of nesting tricolored blackbirds. Similarly, robust populations of nonnative red foxes or even native skunks and raccoons can have significant impacts on nesting birds. In general, control programs will not address native species. However, targeted programs could be initiated in response to observations of individuals taking nests, eggs, or nestlings.

7.4 Data and Reporting

Proper data management, analysis, and reporting are critical to the success of the monitoring and adaptive management program. Data on monitoring methods, results, and analysis must be managed, stored, and made available to Implementing Entity staff, decision makers, scientific advisors, Wildlife Agencies, other interested government agencies including the Corps and Regional Boards, and other appropriate persons. A database and clear reporting procedure are also required for permit compliance. The requirements for database development, maintenance, and data reporting for monitoring are described in Chapter 8 *Plan Implementation*. The reporting requirements for monitoring include the following (also found in Chapter 8):

- A description of the landscape-, natural community–, and species-level monitoring undertaken during the reporting period and a summary of monitoring results, including species status and trends.
- A description of the adaptive management process utilized during the reporting period (e.g., consultation with science advisors, convening of the Independent Conservation Assessment Team).

- A summary of the recommendations or advice provided by the Wildlife Agencies, science advisors, and the Independent Conservation Assessment Team (if applicable) regarding adaptive management and monitoring.
- A summary of the monitoring program objectives, techniques, and protocols including monitoring locations, variables measured, sampling frequency, timing, and duration, analysis methods, and who performed the analyses.
- An assessment of the efficacy of the monitoring and research program and recommended changes to the program based on interpretation of monitoring results and research findings.
- An assessment of the efficacy of habitat restoration and creation methods in achieving performance objectives and recommended changes to improve the efficacy of the methods.
- A description of all Habitat Plan directed studies undertaken during the reporting period; a summary of study results; and a description of integration with monitoring, assessment, and compliance elements.
- An assessment of the appropriateness of performance indicators and objectives (see **Table 7-2** for examples) based on the results of effectiveness monitoring, and recommended changes to performance indicators and objectives.
- A description of any actions taken or expected regarding changed circumstances, including remedial actions.
- A description of any unforeseen circumstances that arose and responses taken.

Table 7-1. Schedule of Monitoring Tasks over the Permit Term

Monitoring Type/ Phase	Summary Tasks
Years 0–5	
Compliance	Set up tracking databases for impacts, acquisition, and restoration to land cover, and covered-plant populations.
Inventory	Initiate inventories in the Reserve System.
	Assess landscape linkages using aerial photos and ground surveys and initiate data – collection program on wildlife movement.
	Submit reserve unit management plans for Wildlife Agencies review and approval within 5 years of the first acquisition for each reserve unit. Each plan will contain a detailed monitoring and adaptive management plan; including the development of indicators, monitoring protocols, and success criteria for management actions.
	Prioritize conservation actions within the Plan area.
Targeted Studies	Develop ecological models for Group 1 species.
	Initiate methods testing for key management actions (e.g., restoration).
	Prioritize and initiate pilot projects.
	Prioritize and initiate directed studies.
Long-Term Monitoring	Develop experimental design for long-term management activities such as restoration and include as part of reserve unit management plans.
Years 6-15	
Compliance	Continue tracking impacts, acquisition and restoration. Ensure that mitigation stays ahead of impacts.
Inventory	Continue baseline inventories as sites are added to the Reserve System.
Targeted Studies	Complete methods testing and pilot projects.
	Continue directed studies.
Long-Term Monitoring	Update GIS layer (every 5 years) and assess trends.
	Monitor covered-species response to management actions.
	Monitor covered species in accordance with the schedule developed in the Habitat Plan and the final detailed monitoring and adaptive management plan.
	Monitor success of restoration sites against success criteria.
	Review existing literature and scientific knowledge and make changes to monitoring and management based on new information.
Years 16–25	
Compliance	Continue tracking impacts, acquisition, and restoration. Ensure that mitigation stays ahead of impacts.
Inventory	Continue baseline inventories as additional parcels are acquired.
Targeted Studies	Complete targeted studies.

Monitoring Type/ Phase	Summary Tasks
Long-Term Monitoring	Continue to assess status and trends of natural communities (aerial surveys) and species.
	Adapt management actions based on monitoring results of species response and success criteria for restoration and other management efforts.
	Continue to monitor covered species and adaptively manage species in response to monitoring results.
	Evaluate efficacy of monitoring protocols using results of pilot projects.
Years 25+	
Compliance	Finalize impact tracking. Maintain database of any active ongoing mitigation.
Inventory	Finalize baseline inventories of parcels acquired after Year 25.
Long-Term Monitoring	Continue to assess status and trends of natural communities (aerial surveys) and species.
	Based on 25 years of implementation, develop reduced monitoring protocols for target species and/or communities.
	Promote directed studies in the reserve system that benefit covered species and natural communities.

Table 7-2. Example Success Criteria for Monitoring Effectiveness of Selected Management Actions[a]

Management Action	Performance Period[1]	Example Success Criteria	
		Example Minimum Value[3]	Example Target Value[4]
Enhance Wetlands and Ponds: ponds and perennial wetlands	__ years following acquisition of ponds and perennial wetlands	*Nonnative predators:* • Maintain __% of all ponds and permanent wetlands free of nonnative fish (except mosquitofish) and bullfrogs in any given year	*Nonnative predators:* • Maintain all ponds and permanent wetlands free of nonnative fish (except mosquitofish) and bullfrogs annually
		Emergent vegetation cover-margins: • Maintain native emergent vegetation along at least __% of pond and perennial wetland edges	*Emergent vegetation cover-margins:* • Maintain native emergent vegetation along at least __% of pond and perennial wetland edges
		Emergent vegetation cover-pond surface: • For ponds designed to support tricolored blackbird breeding: Maintain native emergent vegetation over at least __% of pond surface area	*Emergent vegetation cover-pond surface:* • For ponds designed to support tricolored blackbird breeding: Maintain native emergent vegetation over at least __% of pond surface area
		Hydrology: • Maintain wetlands year-round in normal rainfall years[6] • Maintain ponded surface water until October 1 in normal rainfall years[6]	*Hydrology:* • Maintain wetlands year-round in dry rainfall years[6] • Maintain ponded surface water until October 1 in normal rainfall years[6]
Pond creation	__ years following pond creation	*Extent created:* • __ acres[5]	*Extent created:* • __ acres[5]
		Emergent vegetation cover: • __% of ponds will support native emergent vegetation > 5 feet tall (e.g., cattail or tules) over at least __% of surface area (for Tricolored Blackbird) • __% of ponds will support emergent vegetation over at least __% but no more than __% of the surface area (for California red-legged frog)	*Emergent vegetation cover:* • __% of ponds will support native emergent vegetation > 5 feet tall (e.g., cattail or tules) over at least __% of surface area (for Tricolored Blackbird) • __% of ponds will support emergent vegetation over at least 30% but no more than __% of the surface area (for California red-legged frog)

Table 7-2. Continued

Management Action	Performance Period[1]	Example Success Criteria	
		Example Minimum Value[3]	Example Target Value[4]
		% emergent vegetation cover-margins: • Maintain native emergent vegetation along at least __% of each pond margin	*% emergent vegetation cover-margins:* • Maintain native emergent vegetation along at least __% of each pond margin
		Nonnative predators: • Maintain __% of all ponds of free of nonnative fish (except mosquitofish) and bullfrogs in any given year	*Nonnative predators:* • Maintain all ponds free of nonnative fish (except mosquitofish) and bullfrogs annually
Enhance Grassland	__ years following implementation of preserve-wide management of grasslands (and after pilot study complete)	*% native forb cover:* • Demonstrate an upward trend in __% native forb cover relative to existing conditions	*% native forb cover:* • Increase native forb cover by __% relative to condition at time of acquisition
		% native grass cover: • Demonstrate an upward trend in % native grass cover (annual or perennial) relative to condition at time of acquisition	*% native grass cover:* • Increase native grass cover by __% relative to condition at time of acquisition
		Native plant diversity: • Demonstrate an upward trend in native plant diversity	*Native plant diversity:* • Demonstrate an upward trend in native plant diversity
Increase Natural Burrow Availability and Prey Base in Grasslands	__ years following implementation of measure	*Abundance of burrows:* • Demonstrate and upward trend in burrow density and distribution within the Reserve System	*Abundance of burrows:* • Increase the density of burrows by __% and total acreage of burrow complexes by __% within the Reserve System
Enhance Oak Woodland	Implement measures to increase oak tree establishment and densities within __ years of detecting a decline in canopy cover	*Absolute oak tree canopy cover:* • Maintain the existing __% absolute oak tree canopy cover in oak woodlands on Reserve lands	*Absolute oak tree canopy cover:* • Maintain the existing __% absolute oak tree canopy cover in oak savanna and woodlands on Reserve lands

Table 7-2. Continued

Management Action	Performance Period[1]	Example Success Criteria	
		Example Minimum Value[3]	Example Target Value[4]
Restore Valley Oak Woodland	__ years following initial plantings of oak trees	*Extent restored:* • __ acres[5]	*Extent restored:* • __ acres[5]
		% oak-tree canopy cover: __% tree canopy cover equal to or up to __% greater than the percent canopy cover in valley oak stands removed by covered activities	*% oak- tree canopy cover:* __% tree canopy cover equal to or up to __% greater than the percent canopy cover in valley oak woodlands removed by covered activities
	__ years following initial plantings of oak trees	*Understory native plant cover:* • Develop an understory with native plant cover within __% of existing conditions	*Understory native plant cover:* • Develop an understory with native plant cover equal to or greater than that of existing conditions
		Understory native plant diversity: • Develop an understory with native plant diversity at least __% of existing conditions	*Understory native plant diversity:* • Develop an understory with native plant diversity equal to or greater than existing conditions
Enhance Chaparral and Northern Coastal Scrub	__ years following initial treatments	*Canopy gaps:* • Develop a gap frequency of __% in stands of chaparral and northern coastal scrub	*Canopy gaps:* • Develop a gap frequency of __% in stands of chaparral and northern coastal scrub
		Chaparral plant regeneration: • Demonstrate a steady or upward trend in native chaparral and northern coastal species numbers and/or density	*Chaparral plant regeneration:* • Increase the existing relative native chaparral and northern coastal species numbers and/or density (where appropriate)by at least __%
Enhance Conifer Woodlands	__ years following initial treatments	*Species density:* • Maintain the existing species density	*Species density:* • Develop a species density of __%
		Species composition: • Maintain the existing native species composition	*Species composition:* • Maintain the existing native species composition
		Species regeneration: • Demonstrate the existing species composition is maintained post-treatment	*Species regeneration:* • Demonstrate the existing species composition is maintained post-treatment

Table 7-2. Continued

Management Action	Performance Period[1]	Example Success Criteria	
		Example Minimum Value[3]	Example Target Value[4]
Enhance Riparian Woodland/Scrub	__ years following initial treatments	*Relative native tree canopy cover:* • Demonstrate an upward trend in native plant diversity	*Relative native tree canopy cover:* • Increase the existing relative native tree canopy cover by at least __%
		Relative native shrub canopy cover: • Demonstrate an upward trend in native plant diversity	*Relative native shrub canopy cover:* • Increase the existing relative native shrub canopy cover by at least __%
Restore Streams and Riparian Woodland/Scrub to Compensate for Habitat Loss and to Increase Biodiversity	__ years following restoration planting	*Extent restored:* • __ acres[5]	*Extent restored:* • __ acres[5]
		Relative native tree canopy cover: • Establish a relative native tree canopy cover of at least __%	*Relative native tree canopy cover:* • Establish a relative native tree canopy cover of at least __%
		Relative native shrub canopy cover: • Establish a relative native shrub canopy cover of at least __%	*Relative native shrub canopy cover:* • Establish a relative native shrub canopy cover of at least __ acres

Notes:

[a] This table provides a framework for evaluating the success of certain conservation measures. The Implementing Entity will develop values for assessing success during the Inventory and Targeted Studies phases of implementation

[1] The estimated period following enhancement/creation/restoration of a natural community at a site during which performance standards should be achieved.

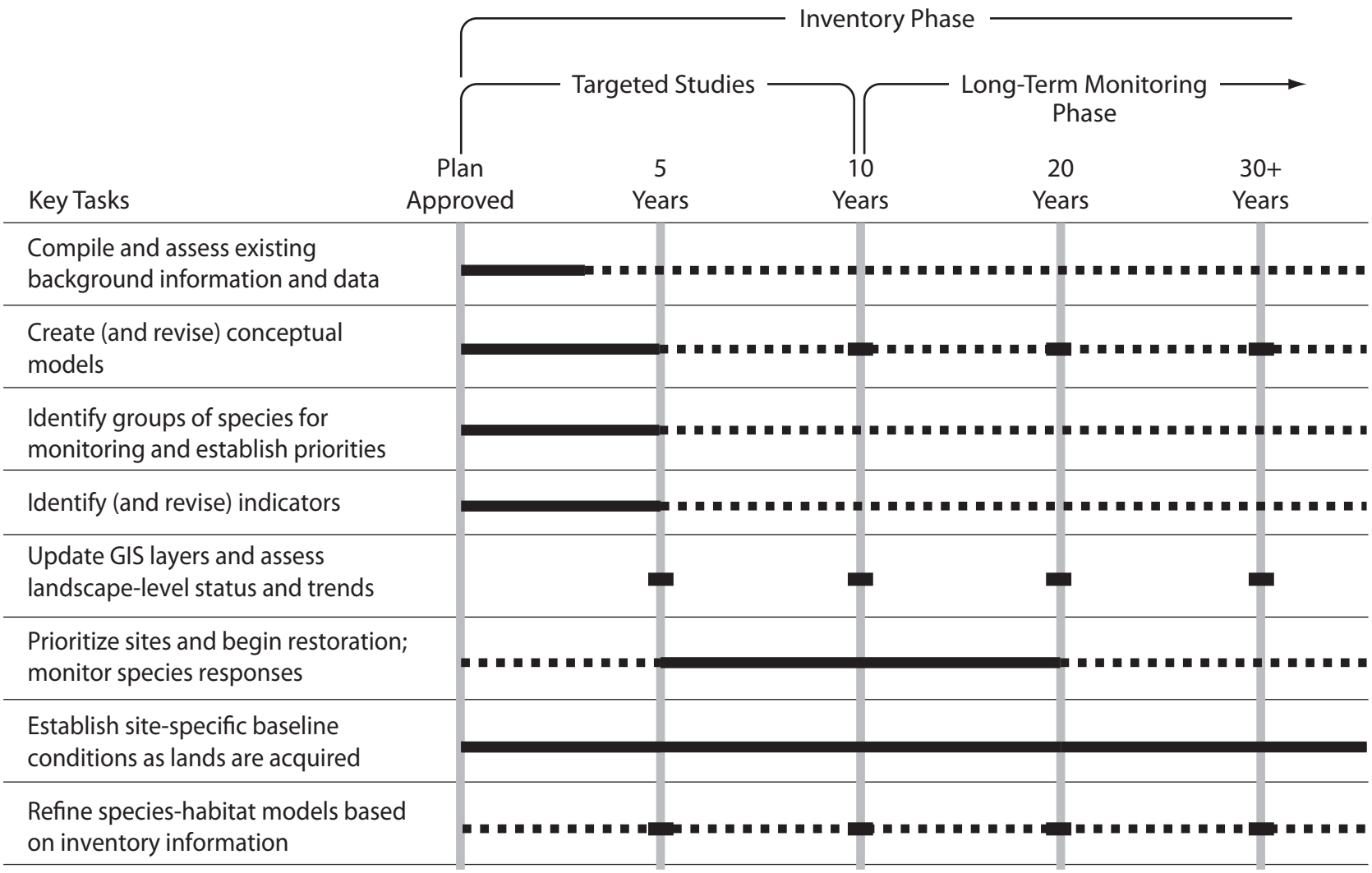
[2] Success criteria are shown in italics.

[3] The example minimum value is the minimum measured value for each success criterion that must be achieved during the performance period.

[4] The example target value represents the optimal desired value for each performance indicator and the design and management objectives for enhanced/created/restored natural communities. If performance objectives are not achieved, adaptive management actions may be triggered.

[5] Acres restored are estimates based on the impact analysis. Actual restoration performance standard/target may vary depending on actual field-verified impacts.

[6] Normal rainfall years are defined as within 1 standard deviation of the annual average rainfall as measured at the California Irrigation Management Information System (CIMIS) __ rain gauge over the hydrologic record of the gauge (October–September). Dry years are defined as less than 1 standard deviation from the annual mean.



Note: Density of line indicates intensity of work.

Adapted from Atkinson et al. 2004.

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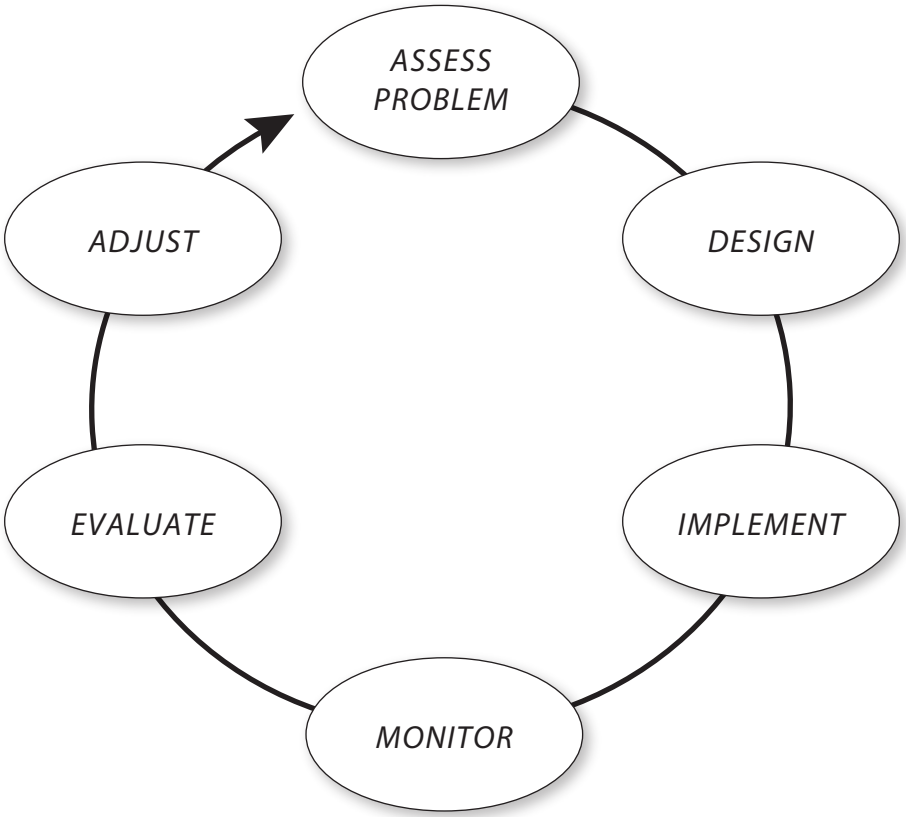
Figure 7-1
Timing of Monitoring Phases

Adaptive Management Process



Adapted from William et al. 2007.

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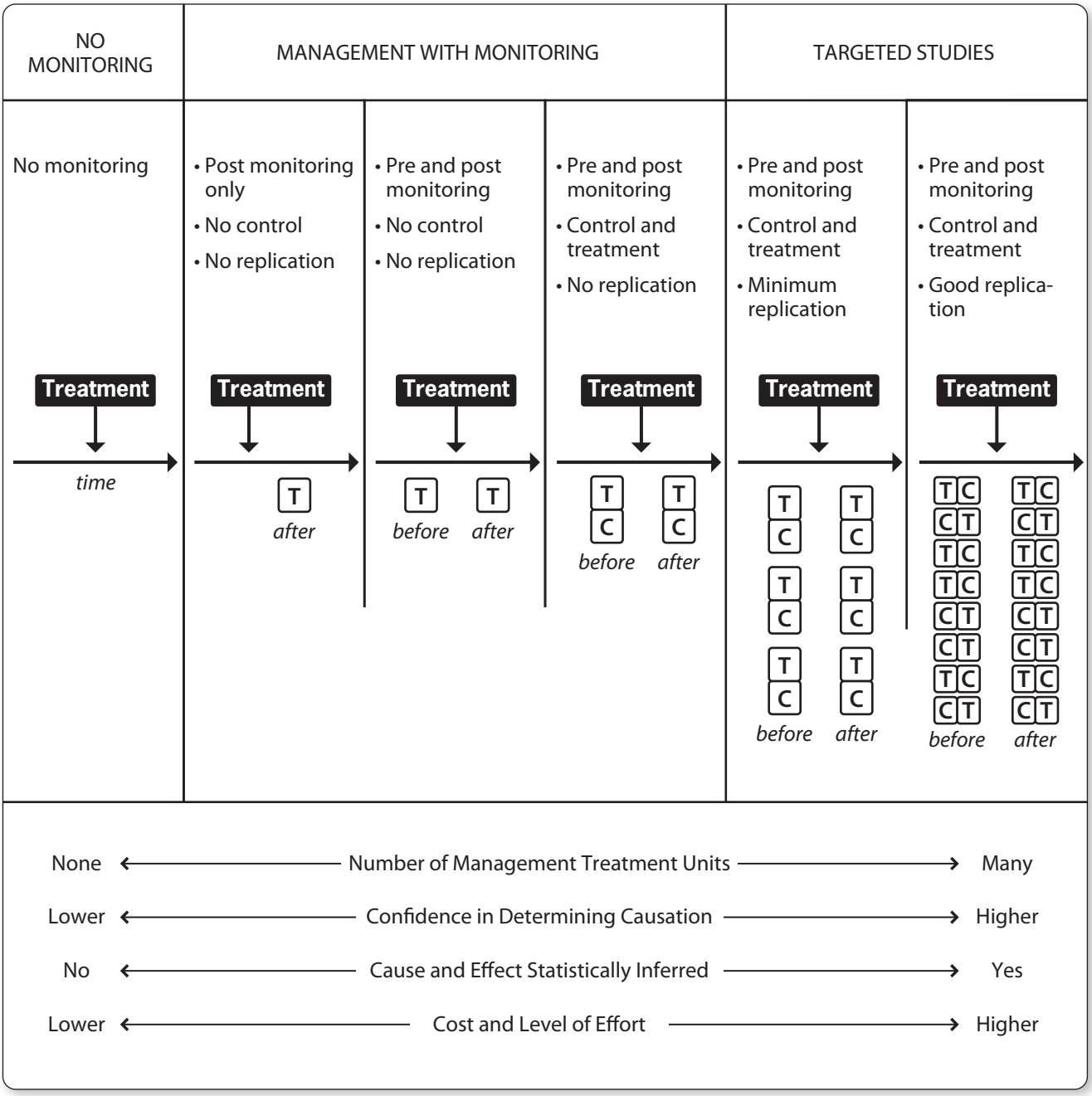
Figure 7-2
Adaptive Management Process



Adapted from Elzinga et al. 1998.

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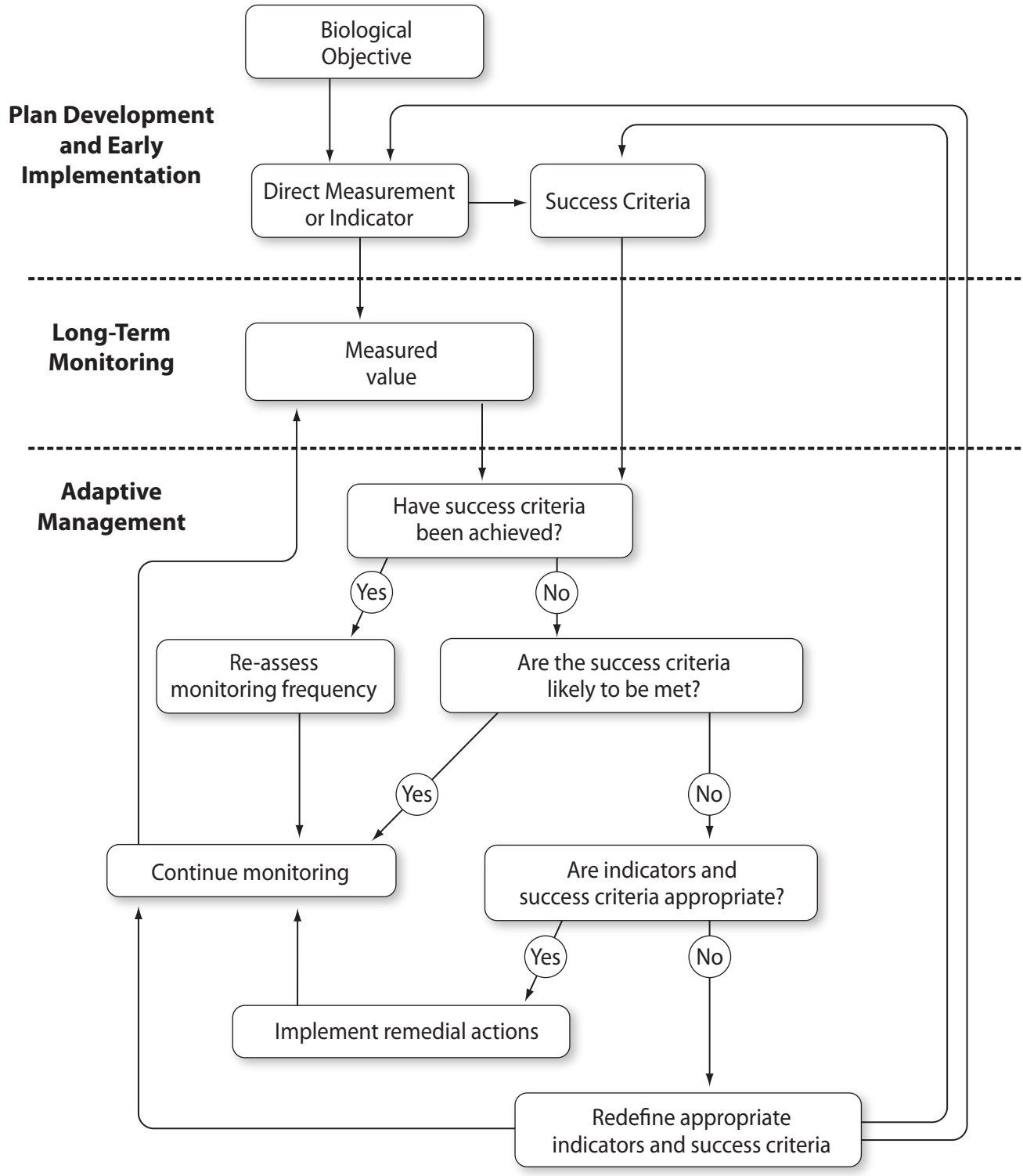
Figure 7-3
Continuum of Experimental Management



Adapted from Draft Guadalupe River Project, Downtown San Jose, California, Mitigation Monitoring Report (Jones & Stokes 2002)

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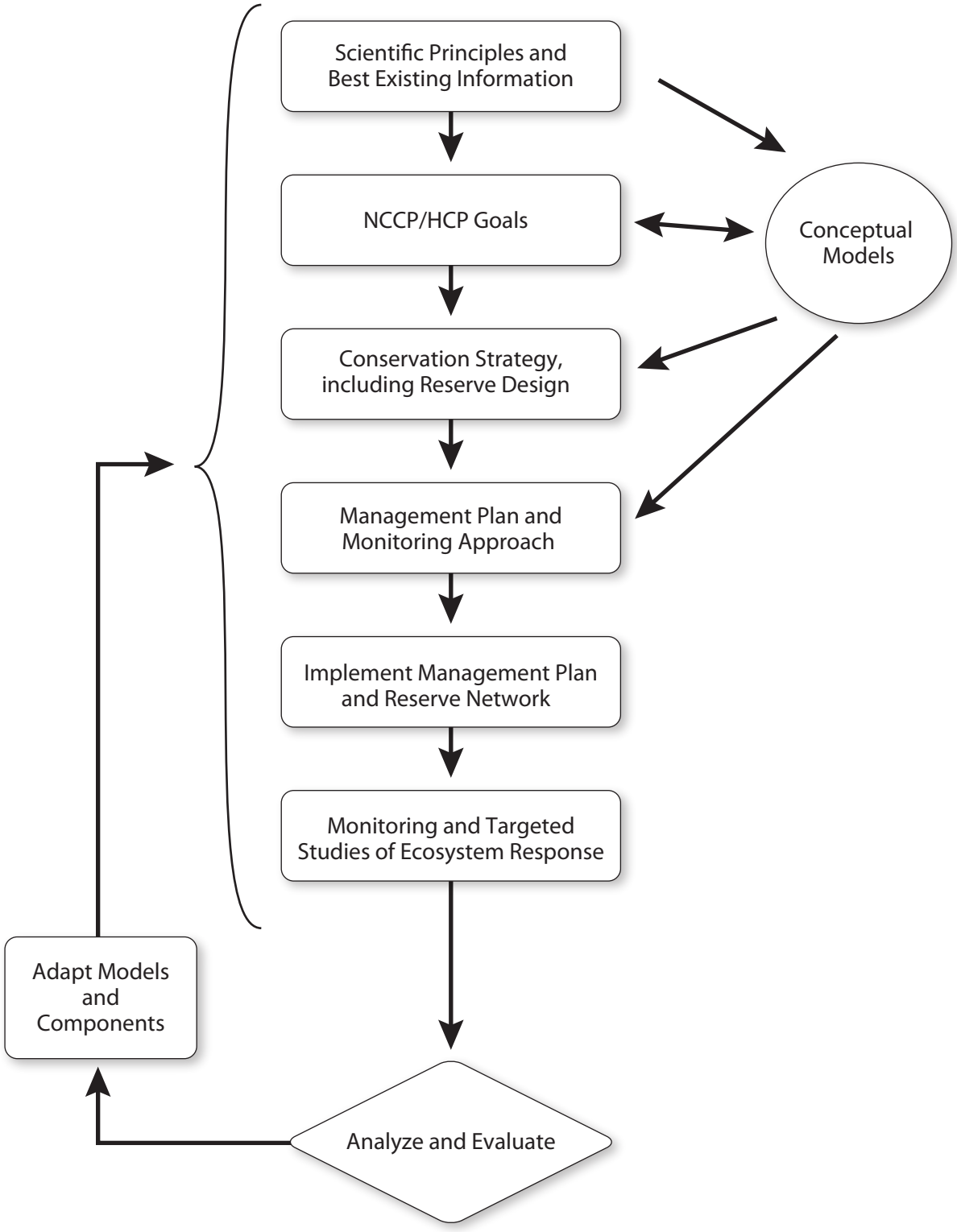
Figure 7-4
Flowchart of the Adaptive Management Process



Excerpted from Atkinson et al. 2004.

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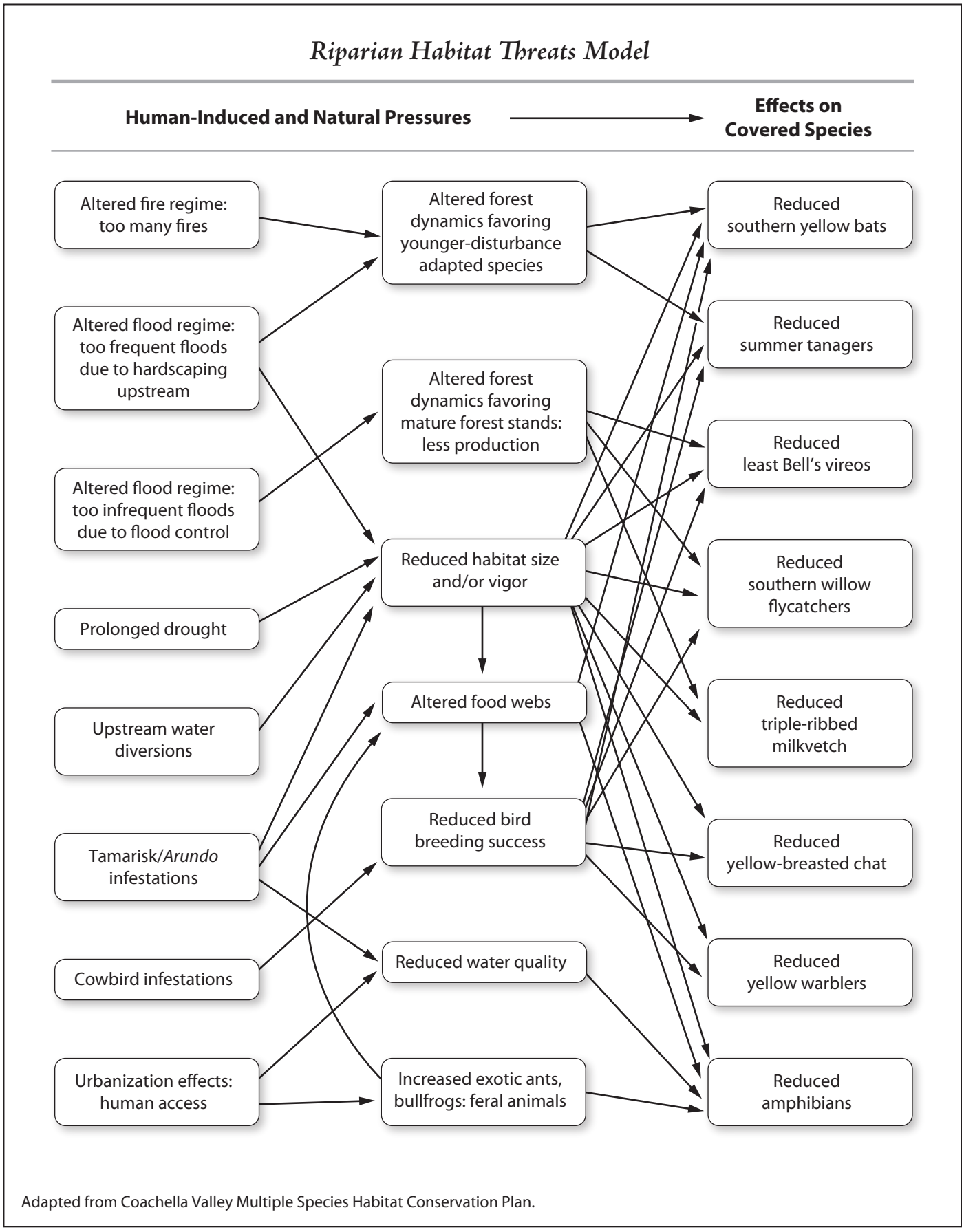
Figure 7-5
Adaptive Management Feedback Loop



Adapted from Coachella Valley Multiple Species Habitat Conservation Plan.

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Figure 7-6
Example Stress-Response Model 1

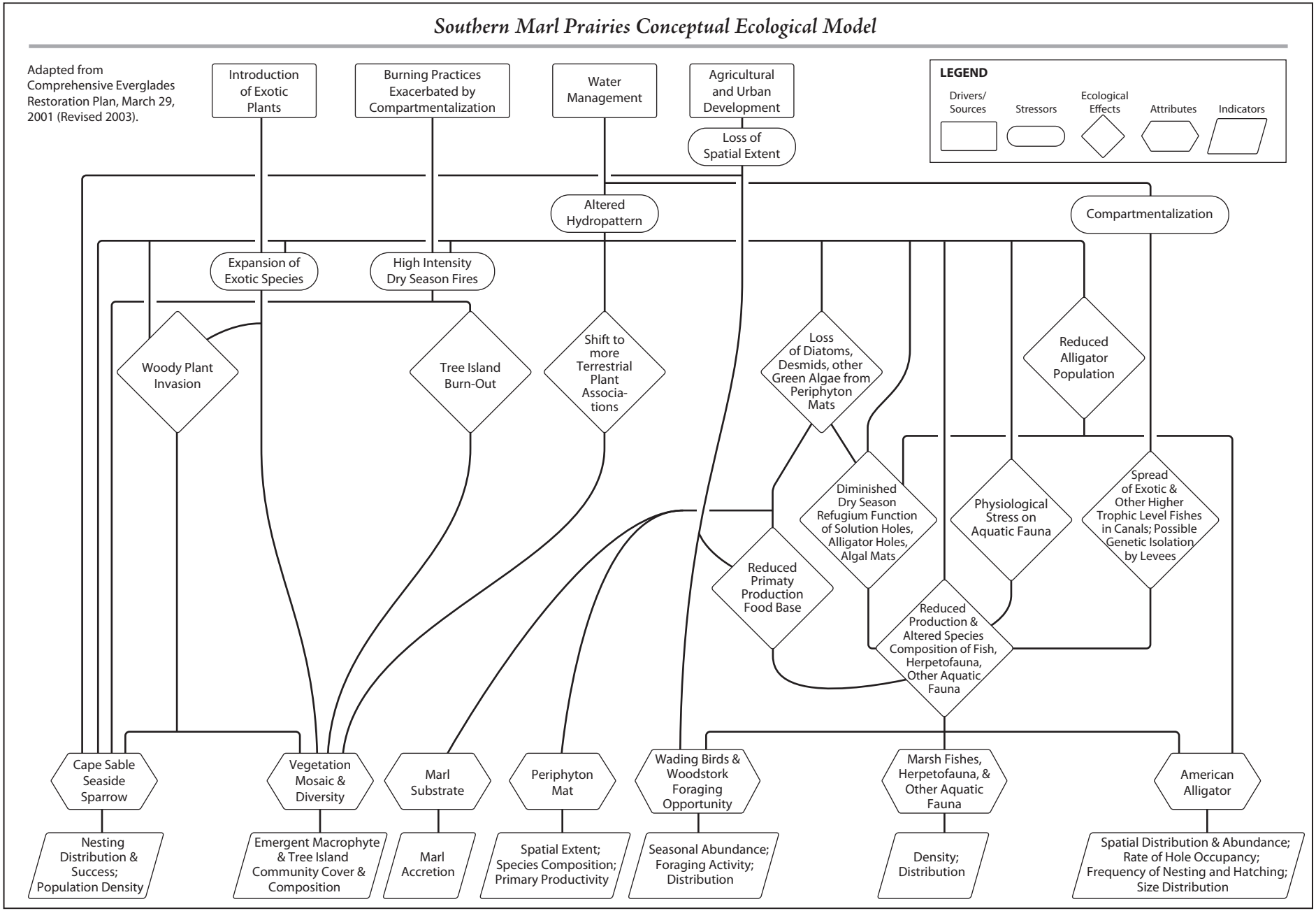

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Figure 7-7
Example Stress Response Model 2

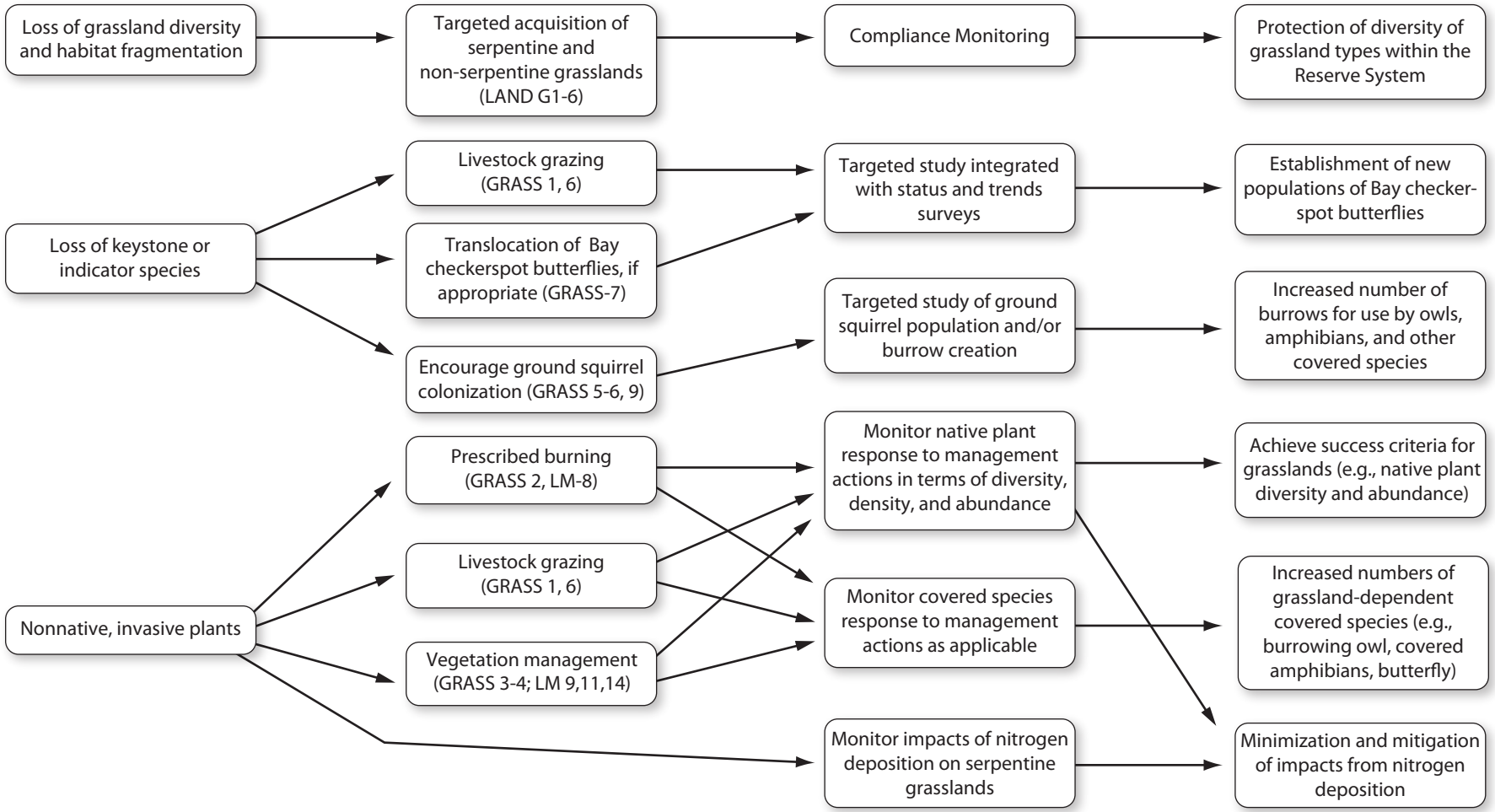

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Figure 7-8
Adaptive Management and Monitoring Conceptual Model for Grassland

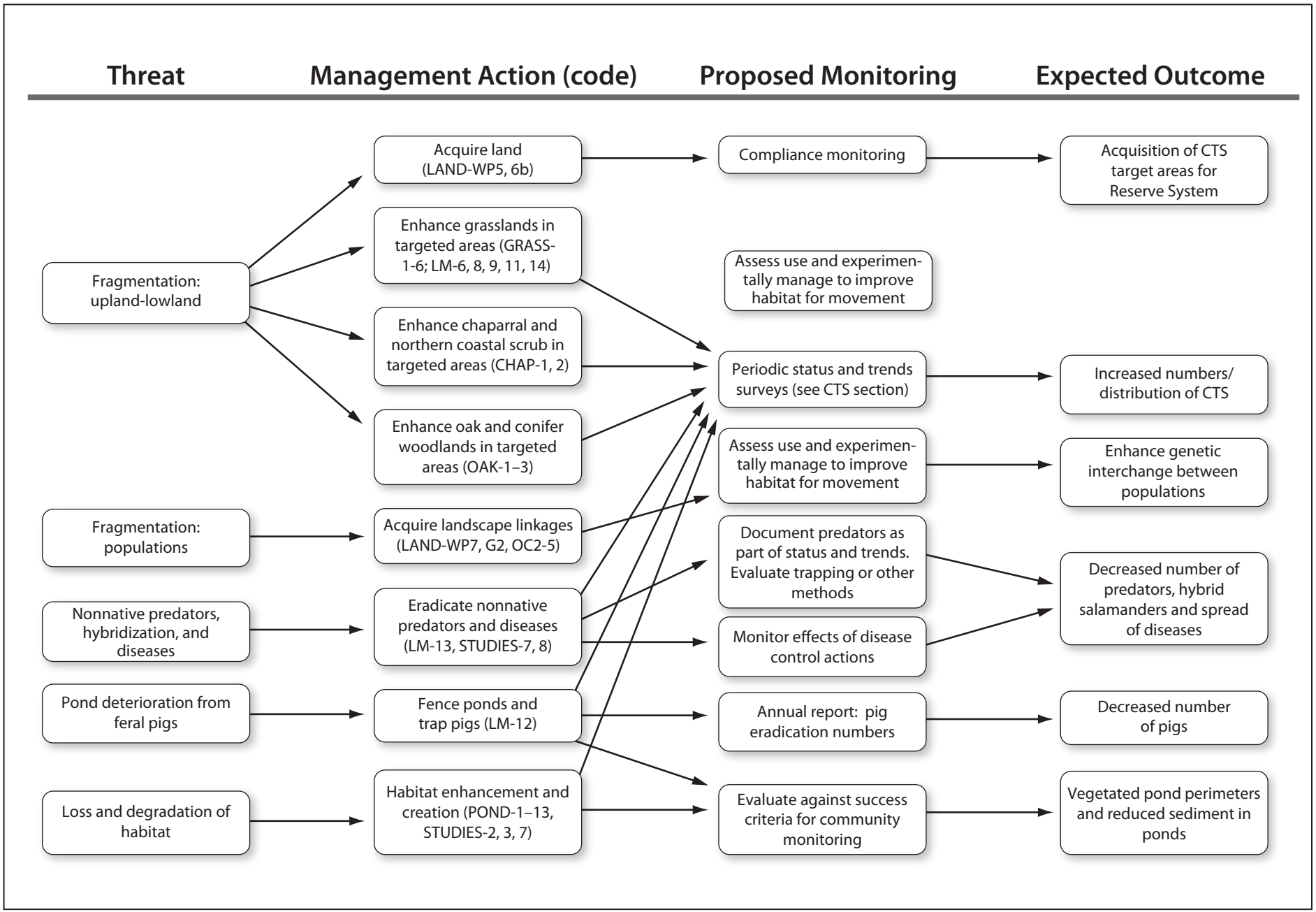

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Figure 7-9
Adaptive Monitoring and Management Conceptual Model for California Tiger Salamander

Chapter 8
Plan Implementation

8.1 Overview

Implementation of the Santa Clara Valley Habitat Plan begins when the Implementing Agreement is executed, the Section 10(a)(1)(B) incidental take permits and NCCP permit are issued, and the local ordinances take effect. Primary responsibility for Plan implementation rests with the Permittees. However, as described in this chapter, other groups are responsible for implementing some aspects of the Plan. The successful execution of the conservation strategy, monitoring program, covered activity approvals, and reporting that are part of the Plan require coordinated actions among the Permittees, Wildlife Agencies, public land managers, and the private sector.

This chapter describes the overall implementation policies of the Plan, including institutional arrangements, organizational structure, approval processes, land acquisition, and roles and responsibilities of signatories to the Implementing Agreement and other stakeholders.

8.2 Implementation Structure

Day-to-day implementation of the Habitat Plan will be managed by staff of the Implementing Entity. The Implementing Entity has the authority to delegate some of its responsibilities to other entities including government agencies and nongovernmental organizations, though the Implementing Entity is ultimately responsible for ensuring implementation of the Habitat Plan. Many existing organizations and agencies in the Santa Clara County area already have significant expertise and experience in performing the necessary functions of the Implementing Entity. The Implementing Entity may be able to more effectively and efficiently ensure implementation of the Habitat Plan by contracting with these existing institutions. However, the Implementing Entity will have the authority to directly implement all aspects of the Habitat Plan itself should this be necessary. Options that could be considered to implement some or all of the duties of the Implementing Entity include those listed below.

- Staff hired by the Implementing Entity and independent of other agencies.
- A land trust specifically formed to help implement the Plan.

- Contracts with existing organizations that have relevant experience and expertise, such as experience with land management or monitoring (e.g., Open Space Authority, County Parks).

Other organizations with important roles in Plan implementation include the Wildlife Agencies, other public and private land management organizations, science advisors, and the public. The roles, responsibilities, and relationships of each group are described below and illustrated in **Figure 8-1**. Unless otherwise stated, all obligations and responsibilities described in this chapter rest with the Permittees and the Implementing Entity.

8.2.1 Permittees

The following agencies will be Permittees under the Plan.

- City of Gilroy.
- City of Morgan Hill.
- City of San José.
- County of Santa Clara.
- Santa Clara Valley Water District.
- Santa Clara Valley Transportation Authority.
- The Implementing Entity.

It is expected that each of these agencies will be a Permittee on the ESA Section 10(a)(1)(B) incidental take permit and the NCCP Act permit providing authorization for take that occurs from their covered activities and from covered activities within their respective jurisdictions (Chapter 2). Each will also be a signatory to the Plan's Implementing Agreement. The Permittees will vest the responsibility for implementing the Plan to the Implementing Entity as described below. To that effect, the Implementing Entity will oversee implementation of the Plan on behalf of the Permittees. However, the Permittees will ultimately be responsible for compliance with all the terms and conditions of the Plan's permits and for the performance of the Implementing Entity. Each local jurisdiction will designate staff to advise the Implementing Entity on Habitat Plan implementation (**Figure 8-1**) and provide a point of contact at the local jurisdiction for the Plan.

Many applications for coverage under the Habitat Plan will be submitted by private project proponents in the participating cities and the County. Each of these jurisdictions will be responsible for confirming that a project within its jurisdiction is eligible for coverage and for determining the completeness of each project application as described in Chapter 6 and in Section 8.7 *Roles and Responsibilities in Reviewing Application for Take Authorization* below. If the project is eligible for coverage and the project proponent has complied with all application requirements and other relevant terms of the Habitat Plan as determined by the participating jurisdiction, the participating jurisdiction will grant take authorization under the Habitat Plan as part of its normal project

review process (e.g., grading permit issuance, EIR certification). Participating local jurisdictions will also be responsible for reporting the relevant details of approved projects to the Implementing Entity (for entry into the Habitat Plan database and for required reporting to the Wildlife Agencies), for monitoring developer compliance with the avoidance and minimization requirements specified in the applicable conservation measures (see Chapter 6), and for collecting fees.

8.2.2 Implementing Entity

The Implementing Entity, proposed to be called the Santa Clara Valley Habitat Agency, is responsible for executing the requirements of the Habitat Plan, the permits, and the Implementing Agreement. The Implementing Entity will hold title to lands or easements it purchases and will oversee cooperative agreements with other land management entities that own and/or manage reserves for the Implementing Entity as part of the Reserve System. The Implementing Entity may also provide funding to local land management agencies and land trusts for them to purchase land for the Reserve System. The Implementing Entity will provide funds for reserve management and monitoring to those agencies and organizations with whom it contracts for such services.

The Implementing Entity will also coordinate with science advisors, outside consultants, and other land management agencies to ensure adequate and coordinated Plan implementation. The Implementing Entity will include, as part of staff or contract resources, a network of scientists, administrators, and other specialists that oversee and carry out planning and design, habitat restoration, monitoring, and adaptive management programs. Staff for these positions may be hired by the Implementing Entity or their functions contracted out to existing local agencies, nonprofit organizations, or private consultants. The Implementing Entity will also coordinate with Wildlife Agencies on a monthly basis and provide the Wildlife Agencies with annual reports.

The Implementing Entity will be a Joint Powers Authority (JPA) composed of the Cities of Gilroy, Morgan Hill, and San José, and the County. The JPA is limited to the four participating jurisdictions because the Joint Exercise of Powers Act requires that a JPA can only exercise powers held by all the participating agencies. Of the participating agencies, only the four jurisdictions have the authority to adopt the Habitat Plan fees (see Chapter 9 for details). Because all of the Permittees are responsible for implementing the Habitat Plan, all of the Permittees will have a role in the Implementing Entity.

The Implementing Entity will have two decision-making bodies, a Governing Board and an Implementation Board, as described below.

Implementing Entity Governing Board

The Governing Board of the Implementing Entity will be composed of two representatives of each of the four participating jurisdictions, for a total of eight members. Each representative will be an elected official from the participating jurisdiction. The Governing Board is responsible for the governance and administration of the Implementing Entity. It may delegate its authority to the Implementing Board except for two duties that must remain with the Governing Board: adoption and modification of Habitat Plan fees and the approval of the Implementing Entity's annual budget. The Governing Board will meet at least twice each year.

Implementing Entity Implementation Board

The Implementation Board will have representation by all Permittees. The 11-member Implementation Board will have two representatives each from the Permittees except for VTA, which, per its request, will have one representative. For the Permittees with two representatives, one must be an elected official. The Implementation Board will meet at least once every two months. The responsibilities of the Implementation Board will include, but are not limited to the following.

- Reviewing and making recommendations to the Governing Board regarding the adoption or modification of fees.
- Review and making recommendations to the Governing Board of annual operating and capital budgets of the Implementing Entity.
- Making decisions regarding the appointment of the Administrative Director and the hiring of or contracting with other Implementing Entity staff, services, or equipment.
- Making decisions regarding property acquisition or conservation easement purchase.
- Reviewing and making recommendations to the Administrative Director regarding grants and other funding opportunities.
- Establishing any committees or subcommittees to help the Implementing Entity fulfill its duties.
- Review and approval of annual reports prior to submittal to the Wildlife Agencies.
- Review of special cases of covered activities not subject to the jurisdiction of a Permittee (e.g., Participating Special Entities; see Section 8.4 *Participating Special Entities* below).
- Review and approval of requests by Permittees or private project proponents to provide non-monetary compensation for impacts in lieu of fees (see Chapter 9 for these provisions).

- Resolution of disputes among Permittees regarding implementation of the Plan.

Implementing Entity Administration

Implementation tasks include support of permanent and seasonal administrative and technical staff who will be responsible for overseeing and ensuring the day-to-day tasks of implementing the Habitat Plan "on the ground." Some or all of the activities of day-to-day implementation may be delegated to and carried out by contract agencies (including Permittees), nonprofit organizations, or contractors that specialize in the necessary functions and duties.

Implementing tasks will also address Plan activities such as identifying and acquiring suitable conservation properties, conducting inventories and monitoring surveys on Habitat Plan reserves, managing lands in the Reserve System, restoring wetlands and streams, creating ponds, maintaining a database of relevant information, tracking land cover and habitat losses and conservation, and reporting all relevant information to the Wildlife Agencies annually. All responsibilities of the Implementing Entity are described below in Section 8.3 *Responsibilities of the Implementing Entity*.

The Implementing Entity will receive advice from the groups discussed in the following sections. The ultimate decisions for all day-to-day activities of the Plan rest with the Implementing Entity and its Implementation Board.

8.2.3 Other Land and Water Management Agencies

Local land and water management agencies other than the Permittees are also important to the Plan's success. Habitat Plan reserves will often border existing parks or public lands owned by other public agencies or private land trusts.

Land and water managers from relevant local organizations will be invited to coordinate closely with the Implementing Entity to ensure that management actions are compatible and consistent across the region. Significant cost savings can be achieved by coordination of local land and water management agencies in undertaking joint management actions that are consistent with this Plan.

8.2.4 Technical Advisory Committee

Many of the land management tasks outlined in Chapter 5 are common to other land management agencies in the county. Therefore, the Implementing Entity would benefit from the advice and partnerships with other land management agencies to perform common tasks. The Implementing Entity will form a Technical Advisory Committee that includes reserve management staff of the

Implementing Entity, staff representing the Permittees, and possibly third party contractors or other partners. Representatives of the Wildlife Agencies will serve as members of the Technical Advisory Committee. Senior managers of other local land management agencies could be invited to participate to share best practices and resources. The Technical Advisory Committee would serve as a coordinating body to provide advice on land management, monitoring, and other Habitat Plan activities in the Reserve System. Biologists at Local Partner agencies could also serve as members of the Technical Advisory Committee, if appropriate. The frequency of meetings of the Technical Advisory Committee will be determined by the Implementing Entity based on need and the activities of the Plan. The Technical Advisory Committee may form subcommittees to address specific issues. The Technical Advisory Committee may sunset at the end of the permit term.

8.2.5 Wildlife Agencies

It is important that the Wildlife Agencies (i.e., USFWS and CDFG) remain as active participants in the implementation of the Habitat Plan. The Wildlife Agencies are responsible for providing guidance to the Implementing Entity and Permittees on how to fulfill the terms of the permits. The Wildlife Agencies also share responsibility to monitor Plan compliance and notify the Implementing Entity as soon as possible if the Plan is not being implemented to their satisfaction. Wildlife Agency staff will take an active role in Plan implementation through review and approval of draft reserve unit management plans and specific covered activities (see Section 8.7.3 for a complete list of covered activities that require additional Wildlife Agency review). The Wildlife Agencies will also review and approve all land acquisition proposals to ensure consistency with the Habitat Plan conservation strategy described in Chapter 5.

The Wildlife Agencies will also assist the Implementing Entity in attempting to secure state and federal funding for Plan implementation (see Chapters 9 and 10). It is expected that the Wildlife Agencies will periodically attend Governing Board and Implementation Board meetings to assist their efforts to ensure that the Plan remains in compliance. Representatives of these agencies will serve as advisory members to the Governing and Implementation Boards and the Technical Advisory Committee.

To ensure regular communication between the Implementing Entity and the Wildlife Agencies, the Implementing Entity will convene and facilitate regular coordination meetings with Wildlife Agency staff to keep them apprised of progress towards conservation goals and objectives, Plan compliance, funding, monitoring and adaptive management, and other relevant topics. Meeting frequency will vary but will likely be monthly or bi-monthly during the first several years of implementation to ensure close communication. These meetings will serve as a means for the Wildlife Agencies to provide advice to the Implementing Entity prior to implementation of key conservation actions such as land purchases, aquatic conservation, habitat restoration, and adaptive management and monitoring. The meeting will also serve as a forum to

troubleshoot issues that arise before they influence permit compliance. These meetings may be separate discussions or part of Technical Advisory Committee meetings.

As stated in Chapter 5, the Wildlife Agencies will review all draft reserve unit management plans and provide comments to the Implementing Entity within 60 days of receipt of these documents. The Implementing Entity will revise the draft plan based on the Wildlife Agencies' comments, if any, and will provide a revised draft to the Wildlife Agencies, which will have an additional 60-day review period. If an initial draft reserve unit management plan or any subsequent revised draft reserve unit management plan adequately addresses a Wildlife Agency's comments, the Wildlife Agency will so notify the Implementing Entity within 60 days, and the reserve unit management plan will be deemed to be approved by that Wildlife Agency for purposes of this Plan, the Implementing Agreement, and the permits. In addition, if a Wildlife Agency does not provide comments within 60 days after receiving the revised draft reserve unit management plan, the Wildlife Agency will thereafter be deemed to have approved the revised draft plan for purposes of this Plan, the Implementing Agreement, and the permits. The Implementing Entity will incorporate comments submitted by the Wildlife Agency after the 60-day period in the revised draft reserve unit management plan to the extent that the Implementing Entity determines the comments can be incorporated.

As stated in Chapter 5, the Wildlife Agencies will review all land acquisition proposals and provide comments to the Implementing Entity within 30 days of receipt of each of these documents. The Implementing Entity will incorporate changes to the documents and provide revised drafts to the Wildlife Agencies within 15 days. These deadlines are established to ensure the timely review and comment on the documents by Wildlife Agency staff and to enable the Implementing Entity to acquire land as soon as possible. If the Wildlife Agencies do not respond within 30 days, the Implementing Entity may proceed with the land acquisition.

A subset of the covered activities will require additional review and approval by the Wildlife Agencies to ensure that the covered activity is adequately defined, consistent with the Habitat Plan, and incorporates appropriate conditions of approval in Chapter 6. See Section 8.7.3 *Wildlife Agency Responsibilities* for more discussion of this responsibility. See Section 7.2.3 *Program Implementation* for the Wildlife Agencies' role in the implementation of the monitoring program.

Dispute Resolution

The Implementing Entity and the Wildlife Agencies will strive at all times to work in good faith with each other to reach mutual agreement on key implementation tasks such as adaptive management, monitoring, and conservation actions. If disagreements arise that cannot be resolved easily, the Implementing Entity will follow the "meet and confer" dispute resolution process outlined in Section 6.6.1 of the Implementing Agreement, and if necessary, the

"elevation of dispute" process outlined in Section 6.6.2 of the Implementing Agreement (**Appendix B**).

Permit Suspension or Revocation

The Wildlife Agencies have the ability in accordance with applicable State and Federal law to suspend or revoke all or part of the permits in the event that any of the Permittees are out of compliance with the Plan, the Implementing Agreement, or the permits. The USFWS has the ability to suspend or revoke all or part of the ESA permits if continuation of covered activities appreciably reduces the likelihood of the survival and recovery of the species in the wild[1]. CDFG has the ability to suspend or terminate all or part of the NCCP permit if revocation or termination is required to avoid jeopardizing the continued existence of that portion of a covered species' (listed or non-listed) range that occurs within the Plan area and to fulfill a legal obligation of the CDFG under the NCCP Act[2]. If such a situation arises, the Wildlife Agencies will notify the Permittees of the actions they must take, if any, to prevent jeopardy to the listed species and maintain the permits, giving the Permittees a reasonable opportunity to implement such actions. See the Implementing Agreement for details.

If one or more of the permits are revoked, the Permittees have the obligation to fulfill all outstanding mitigation requirements, including management and monitoring of the Reserve System in perpetuity, for any take that occurs prior to the revocation. For example, if the Permittees were behind on compliance with the Stay-Ahead provision for land acquisition or restoration, they would be required to meet this obligation (see Section 16.7 of the Implementing Agreement for details [**Appendix B**]).

8.2.6 Scientific Review

The adaptive management process described in Chapter 7 requires that the Implementing Entity consult scientists outside of the Implementing Entity to help advise them on issues related to habitat management and monitoring (see also subheading *Structure of the Adaptive Management Decision-Making Process* below). Scientists with expertise in conservation biology, management of local natural communities and agricultural lands, and the ecology of covered species will be consulted by the Implementing Entity to provide input, as appropriate. The scientific expert's primary function is to provide technical advice and help assemble the best available scientific data on reserve assembly, monitoring, and adaptive management. A separate group of scientists will be convened in an Independent Conservation Assessment Team to provide input on the overall Plan progress at least every five years. More detail on the structure, role, and schedule of this scientific input is provided in Chapter 7, Section 7.2.3 *Program*

[1] 50 Code of Federal Regulations Sections 13.28–13.29, 50 Code of Federal Regulations Sections 17.22(b)(8) and 17.32(b)(8).
[2] California Fish and Game Code Sections 2820 and 2823.

Implementation subheading *Independent Conservation Assessment Team*. Scientists may be consulted after the permit term to continue to provide advice on monitoring and adaptive management.

8.2.7 Public Input

Public input is fundamental to ensuring the success of and continuing support for the Plan throughout implementation. The NCCP Act requires that the Implementing Agreement provide for periodic reporting to the public on the progress of NCCP implementation. Meetings of the Governing Board and Implementation Board will be open to the public, and public comments will be solicited and heard at each meeting[3]. In addition, the public can contact the staff of the Implementing Entity to comment on various aspects of Plan implementation. All data and reports associated with the monitoring program for this Plan will be available to the public, with the exception of reports documenting surveys on private lands considered for acquisition or conservation easements not yet acquired by the Implementing Entity. Monitoring reports will also be posted on the Habitat Plan web site.

Public Advisory Committee

The Implementing Entity will establish and appoint a public advisory committee to solicit input from stakeholders with interest in Plan implementation. The committee will advise the Implementing Entity. Staff from the Permittees should participate in public advisory committee meetings to help ensure broad coordination among those parties interested in and responsible for implementing the Plan. Meeting frequency will be determined by the Implementing Entity and the committee; quarterly meetings are recommended initially. Meetings will be open to the public. The committee may sunset at the end of the permit term.

The public advisory committee can provide input to the Governing and Implementation Boards, Technical Advisory Committee, and staff on all aspects of Plan implementation, with an emphasis on the following topics.

- Expenditure of funds for habitat conservation actions.
- The general application of conditions on covered activities (Chapter 6).
- Achieving the biological goals and objectives of the Plan.
- Operation of reserves, monitoring, and adaptive management.
- Technical information and expertise regarding monitoring, management, and restoration.
- Adherence to Plan commitments (e.g., No Surprises, neighboring landowner assurances).

[3] The Governing Board may need to also hold periodic closed-door sessions to discuss confidential items such as land transaction negotiations or legal matters.

Annual Public Meeting

At least once annually, the Implementing Entity will convene a meeting to report on the progress of implementation directly to the public. The Implementing Entity will summarize habitat losses and gains, habitat restoration and creation, and management and monitoring accomplishments for the previous year. The meeting will provide an informal forum for the public to pose questions and provide comments directly to the Implementing Entity on the overall progress of Plan implementation. The annual public meeting may coincide with one of the regular Governing Board or Implementation Board meetings. Periodic formal review of Plan progress in a public forum may also be appropriate and could perhaps coincide with the 5-year conservation reviews by the Independent Conservation Assessment Team (see Section 7.2.3 *Program Implementation* subheading *Independent Conservation Assessment Team*).

8.3 Responsibilities of the Implementing Entity

The Implementing Entity is tasked with the actual implementation of the Plan. As described above, the Implementing Entity will be receiving advice on Plan compliance and implementation from a variety of sources, including the Wildlife Agencies, science advisors, and the public. The Implementing Entity will seriously consider all of this advice to implement the Plan effectively and cost-efficiently. The Wildlife Agencies have review and approval authority over certain components of implementation (e.g., land acquisition, reserve unit management plans, reservoir-specific dewatering plans, and major changes in monitoring and adaptive management). However, the ultimate decisions for Plan implementation and compliance with the permits, Implementing Agreement, and Habitat Plan rest with the Implementing Entity.

Although the Implementing Entity is responsible for all of these tasks, it may contract with a Permittee, other local organization, or consultants to perform one or more of their responsibilities. These responsibilities include but are not limited to those listed below.

Administration

- Developing and maintaining annual budgets and work plans.
- Developing standardized forms and checklists for Application Package processing.
- Obtaining grants and other outside funding sources, including tracking and reporting grant compliance.
- Collecting Habitat Plan fees from Permittees directly for their covered activities or from participating jurisdictions after they collect fees from private project proponents (as described in Chapter 9).

- Receiving, managing, tracking, reporting, and expending funds to implement the Plan.
- Training staff of local jurisdictions to review applications for take authorization under the Plan. Assisting local jurisdictions to ensure that project proponents comply with the conditions on covered activities described in Chapter 6.
- Providing tools to the Permittees to support the application review process.
- Serving as the final arbiter of whether a project or activity is covered under the Plan.
- Administering the Neighboring Landowner Assurances program described in Chapter 10.
- Creating and maintaining a database to track Plan compliance, which includes 1) implementation of all conservation actions, 2) progress towards the biological goals and objectives, 3) implementation of the monitoring and adaptive management program, 4) implementation of conditions on covered activities, and 5) all impacts on land cover types, modeled habitat for covered species, occupied habitat for selected species, and covered plant occurrences.
- Creating and maintaining a database and models to support the evaluation of land acquisition opportunities and other conservation actions to meet the requirements of the Plan.
- Ensuring that conservation actions are being implemented roughly proportional in time and amount to the impacts on land cover types authorized under the Plan (e.g., see Section 8.6.1 *Stay-Ahead Provision*), and forecasting land acquisition needs in order to comply with the Stay-Ahead provision.
- Notifying the Permittees of the requirement to make the land in lieu of fee provision compulsory when the Plan is out of compliance or in jeopardy of being out of compliance with the Stay-Ahead provision, as well as notifying them when this requirement may be lifted (see Section 8.6.1 *Stay-Ahead Provision*). Land acquired must always meet the requirements of the Plan as described in Chapter 5.
- Calculating and publicizing the amounts of annual fee adjustments and distributing these calculations to the Permittees, in accordance with Chapter 9.
- Performing the periodic fee assessments described in Chapter 9.
- Convening regular meetings (i.e., Wildlife Agencies, Public Advisory Committee, Annual Meeting, Independent Conservation Assessment Team).
- Preparing the Annual Reports (see Section 8.10 *Data Tracking* below).

Conservation Implementation

- Implementing all conservation actions described in Chapter 5 or coordinating with partners to implement conservation actions, and ensuring compliance with all Plan requirements.
- Researching land acquisition opportunities (fee title or conservation easement) to meet the requirements of the Plan.
- Negotiating and securing land and water acquisition or conservation easements with private landowners.
- Negotiating land acquisition or conservation easements in partnership with other organizations.
- Coordinating with Permittees to ensure that the Plan is implemented consistently and effectively.
- Reviewing offers of land in lieu of fees that may be made by project proponents (see Section 8.6.7 *Land Dedication In Lieu of Development Fee*) or conservation action in lieu of fees by a Permittee and making determinations on other implementation matters that require approval of the Implementing Entity, as specified in this Plan or the Implementing Agreement.
- Monitoring and enforcing, if necessary, landowner compliance with conservation easement terms[4].
- Developing enforcement procedures for the Reserve System and individual reserves (e.g., public and pet access controls) that will be incorporated into the reserve unit management plans.
- Developing reserve unit management plans for groups of parcels that share common land cover types and habitats.
- Designing and implementing habitat enhancement, restoration, and creation projects and managing the affected areas in an adaptive management framework (see additional detail below). This task includes developing site-specific restoration management plans.
- Obtaining additional permits for site-specific projects in the Reserve System (e.g., wetlands permits and cultural resources compliance for restoration projects), as needed.
- Conducting outreach to landowners, local community groups and agencies, and the general public regarding the Plan and its goals.
- Developing and managing a volunteer program to provide an opportunity for the public to contribute to the successful implementation of the Plan.
- Periodic mapping of the study area to update the land cover maps and habitat models and calculations. Modeled habitat impacts (**Table 4-4**) and modeled

[4] Enforcement actions on private land under conservation easement for the Reserve System would be conducted by the Implementing Entity with assistance from the appropriate local jurisdiction. Enforcement actions on land in the Reserve System owned by a public agency would be conducted by that agency with assistance from the Implementing Entity.

habitat acquisition requirements (**Table 5-17**) will be tracked based on the most recent models available. Implementation of conditions described in Chapter 6 (e.g., species surveys) and the conservation strategy (Chapter 5) will be informed by the most current land cover maps and habitat models updated and maintained by the Implementing Entity as needed throughout the permit term.

- Coordinating and communicating with local land management agencies.
- Designing a scientifically valid monitoring program and monitoring habitat and species on reserves (see additional detail below and in Chapter 7), including site inventories, targeted studies, compliance monitoring, effectiveness monitoring, and status and trend monitoring.
- Monitoring changed circumstances identified in Chapter 10 that might arise and if they do, following the remedial measures and procedures outlined in Chapter 10.
- Developing partnerships with local academic institutions to help direct research towards management and monitoring needs of the Plan.
- Conducting or overseeing land and water management activities that are part of the conservation strategy.
- Monitoring and tracking land acquisition and other conservation actions within and adjacent to the study area performed by others to ensure coordination and compatibility with Plan actions.
- Developing and conducting educational programs for landowners and the public consistent with the conservation strategy.
- Ensuring involvement of the public, science advisors, interested agencies, and others in Plan implementation.

The Implementing Entity will utilize specialists as needed to ensure proper implementation of these tasks. Key functions and roles are described below and illustrated in **Figure 8-2**. The Implementing Entity will have several core staff members that are dedicated to Plan implementation, as described below.

8.3.2 Administrative Director

The administrative director would be a staff person dedicated to the Plan who reports to the Implementation Board and directs the activities of the Implementing Entity. The administrative director is responsible for implementing all of the tasks listed above, including periodic reporting to the Implementation Board. The administrative director will also oversee periodic reviews of the Permittees to ensure compliance with the terms of the permits, Implementing Agreement, and Plan on behalf of all Permittees. Finally, the administrative director will serve as the primary link between Implementing Entity staff, local jurisdictions, Wildlife Agencies, other decision makers, and the general public.

8.3.3 Science

Scientific expertise is needed within the Implementing Entity to help direct all technical aspects of Plan implementation, including land and water management and the monitoring and adaptive management program. Implementing Entity staff or designees will collect and analyze data as required by the Plan, keep abreast of current scientific methods and concepts, and provide continuous oversight of the monitoring and adaptive management program (e.g., monitoring methods, study designs) to ensure that the Reserve System incorporates the most appropriate strategies with the latest technology and best management practices. The Implementing Entity will be responsible for communication with external scientists, including agency scientists and the larger conservation science community. The Implementing Entity must also encourage relationships with agency and academic scientists to facilitate collaborations that will contribute to the Plan's conservation goals.

8.3.4 Real Estate Activities

The Implementing Entity conducts relevant financial and legal analyses to guide selection of parcels for the Reserve System, and conducts or manages appraisals and transactions. A specialist will be needed with expertise in real estate law, zoning, and local regulations to fulfill the fiduciary duties of the Implementing Entity for its properties. The Implementing Entity may work with other organizations who partner with it to acquire land to fulfill requirements of the Plan. Existing agencies may already have staff with these skills; the Implementing Entity could partner with such agencies to obtain these skills externally.

8.3.5 Grant Administration

The Implementing Entity is responsible for managing all grants, contracts, and other funding sources during Plan implementation. The Implementing Entity must establish clear accounting procedures and methods for disbursing funds and actively pursue and acquire additional funding for Plan implementation. The Implementing Entity will actively write grant applications to secure these funds. The Implementing Entity may work with other organizations who partner with it to seek grants to fulfill Plan requirements. Existing agencies may already have staff with these skills; the Implementing Entity could partner with such agencies to obtain these skills externally. For any grants received, the Implementing Entity must also monitor, track, and report to the granting agency according to the grant requirements.

8.3.6 Budget Analysis

The Implementing Entity is responsible for developing and monitoring budgets, processing invoices, managing financial reserves, identifying cost savings, and managing administrative contracts (e.g., liability insurance). The Implementing Entity must also track expenditures and cash flow and establish and maintain an internal accounting system and procedures.

8.3.7 GIS/Database Maintenance

The Implementing Entity will use GIS or other equivalent spatially-explicit database systems to collect, store, and utilize relevant spatial data necessary for Plan implementation and maintain them to track compliance and to guide reserve design and monitoring and adaptive management programs. For example, the Implementing Entity must be able to query the database to summarize take and conservation by year (by land cover types, plant occurrences, and modeled habitat for covered species) and cumulatively. The Implementing Entity will track all data related to the progress of meeting Plan goals and objectives. The Implementing Entity will also ensure development and management of the public website for the Habitat Plan.

8.3.8 Reserve Management and Monitoring

The Implementing Entity will direct the management of land acquired for the Reserve System and coordinate with managers of other protected areas to form a biologically cohesive network of protected lands in the study area. These activities will include regular patrol, trash removal, fence/gate installation and repair, road maintenance, and other necessary activities.

Some conservation actions that occur either in or outside the Reserve System may be performed by a Permittee. The Implementing Entity will coordinate with these Permittees and other local agencies to conduct conservation actions that it cannot perform itself or would perform less efficiently.

The Implementing Entity is responsible for developing reserve unit management plans for all units of the Reserve System to guide site-specific management (see Chapter 5). The Implementing Entity will develop site restoration plans (see Chapter 5), including designs and construction drawings, or will oversee contractors conducting these tasks. The Implementing Entity will also be responsible for interim management of acquired lands prior to completion of these reserve unit management plans.

The Implementing Entity is responsible for designing and implementing the monitoring and adaptive management program described in Chapter 7. The Permittees and the Implementing Entity are responsible for all management and monitoring on the Reserve System after the permits expire (i.e., in perpetuity).

Management Conducted by Third Parties

The Implementing Entity may contract with a third party landowner, contractor, or other agency or organization to conduct management activities within the Reserve System on the Implementing Entity's behalf. Some of these management activities may result in take of covered species, as described in Chapter 4. To ensure that the third party manager adheres to the terms of the Habitat Plan, the permits, and the Implementing Agreement, the Implementing Entity will enter into a contract with this third party. The contract will specify the work to be performed, the applicable terms of the Habitat Plan and permits, and the take authorization that is extended to the third party, if applicable.

If a third party conducts land management on behalf of the Implementing Entity, another party must conduct the monitoring of those management activities to ensure independent assessment of the effectiveness of those actions.

Structure of the Adaptive Management Decision-Making Process

Key to the success of the adaptive management program is a clear and effective structure for making decisions on the basis of new data from Plan monitoring and information from other sources. The organizational structure of the monitoring and adaptive management decision-making process is described in detail in Chapter 7 *Monitoring and Adaptive Management Program*. This structure has been designed to be efficient and agile in order to respond quickly to monitoring results or new scientific data.

In general, the Implementing Entity oversees the adaptive management and monitoring program. The Wildlife Agencies will provide input and help guide the program, but the Implementing Entity has ultimate responsibility for implementing the program and instituting changes through adaptive management. Additional responsibilities of the Implementing Entity include prioritizing management actions, disseminating information, developing annual and long-term work plans, and facilitating input from the public and outside scientists. The Administrative Director of the Implementing Entity will work with the Entity's science and management resources to implement the adaptive management and monitoring program. Reserve managers, who will be in charge of day-to-day activities within the reserves, will also contribute to annual work plans and formulate adaptive management recommendations for the Plan as a whole.

A pool of scientists will provide external input regarding implementation of the monitoring and adaptive management program. Input will be provided regularly or as needed to help guide monitoring protocols and experimental design, to interpret results and generate hypotheses, and to comment on the overall success of the monitoring and adaptive management program in achieving the biological goals of the Plan.

The Wildlife Agencies will provide feedback on the implementation of the adaptive management and monitoring program described in the annual work plans. Individuals with the Wildlife Agencies with particular expertise in management may also participate as science advisors. All forms of input will be collected by the Implementing Entity and incorporated into management and monitoring practices (see Chapter 7 *Monitoring and Adaptive Management Program* for more details). The Wildlife Agencies will have review and approval authority over major changes in the reserve unit management plans to ensure compliance with the permits, Implementing Agreement, and Habitat Plan.

An Independent Conservation Assessment Team will provide conservation reviews every 5 years. The scope of review for the Conservation Assessment Team will vary each time they are convened. The role of the Independent Conservation Assessment Team is described in detail in Chapter 7, Section 7.2.3 *Program Implementation* subheading *Independent Conservation Assessment Team*.

Local land managers will be invited to help guide Plan implementation as advisors to the Implementing Entity and the Implementation Board and these organizations will coordinate closely with the Implementing Entity. As mentioned above, these management agencies may wish to establish a formal committee to facilitate coordination and information sharing.

8.3.9 Public Outreach and Education

As described in Chapter 5 (Section 5.3.2 *Landscape Conservation and Management*), the Implementing Entity will conduct outreach to local private and public landowners and residents that will include education on the management goals and objectives as well as implementation techniques. The focus of public education and outreach activities will be to raise landowner and public awareness of reserve management goals, actions and methods, and how the public can support them. To that end, the Implementing Entity will ensure development and management of a public web site for the Habitat Plan. Where appropriate, the Implementing Entity will develop and publish guidelines for local landowners and provide education programs to assist in the implementation of these guidelines. Public education and outreach will be coordinated with other local agencies providing similar services in the study area (e.g., County Parks, SCVWD, and Open Space Authority).

8.3.10 Legal and Financial Services

Legal counsel will provide guidance during Plan implementation on an as-needed basis for drafting and reviewing conservation easements, reviewing land purchases, assisting with land transaction negotiations, assisting with legal challenges, and assisting with easement violations if they occur. To the extent possible, in-house attorneys for the Permittees may provide legal counsel to the

Implementing Entity. However, certain circumstances may require specialized third-party legal assistance.

Financial analysis assistance will be required periodically to review the program's cost/revenue balance and ensure that development fees are adjusted with changing land costs and inflation.

8.3.11 Consultants and Contractors

Consultants will be retained to meet any technical or scientific needs that cannot be effectively or efficiently addressed through in-house staff due to insufficient expertise or availability. It is expected that consultants will be utilized more heavily during the early stages of Plan implementation, becoming less necessary as the Implementing Entity develops and becomes more familiar with the Reserve System. Contractors will be needed for construction tasks within the Reserve System requiring specialized skills or the use of heavy equipment, such as road grading, restoration grading, plant propagation, restoration planting, building recreational facilities, and water-well construction and maintenance.

8.3.12 Responsibilities of the Local Jurisdictions

The local jurisdictions with land use planning and development review and decision-making authority participating in this Plan (Cities of Morgan Hill, Gilroy, San José; County of Santa Clara) have a special responsibility to assist with implementation because of their authorities as local governments. As Permittees and members of the Implementing Entity, the participating local jurisdictions will support Plan implementation by:

- Receiving, reviewing, and approving applications for take authorization under the Plan from private project proponents according to the procedures and requirements described in Chapter 6.
- Requiring private project proponents to pay Habitat Plan fees established by the Implementing Entity (see Section 8.5 *Local Implementing Ordinances*) and as described in Chapter 9.
- Periodically, and at least annually, transferring the Habitat Plan fees to the Implementing Entity to support Plan implementation.
- Reporting, at least annually, to the Implementing Entity the applications and approvals for take authorization under the Plan, including take associated with projects exempt from fees and/or conditions of this Plan.
- Monitoring the implementation of conditions on covered activities on project sites.
- Participating in the Implementing Entity's Technical Advisory Committee.
- Coordinating closely with the Implementing Entity regarding Plan implementation.

8.4 Participating Special Entities

Public or quasi-public entities, such as special districts or entities not subject to the jurisdiction of the Permittees, may conduct or initiate projects or ongoing activities within the permit area that could affect listed species and that may require take authorization from USFWS and/or CDFG. Such organizations may include existing or future school districts, water districts, irrigation districts, transportation agencies, local park districts, geologic hazard abatement districts, or other utilities or special districts that own land or provide public services. These public agencies, known as Participating Special Entities, can request coverage under the Plan during Plan implementation; such coverage would provide take authorization for their projects[5]. Municipalities that are not a Permittee are not eligible to participate using this status[6]. The following is a partial list of special districts that occur in the permit area and that could be eligible as a Participating Special Entity provided they meet the criteria described below.

- Community College Districts
- K-12 School Districts.
- Burbank Sanitary District.
- Central Fire Protection District.
- County Library Service Area 1.
- County Sanitation District No. 2-3.
- Guadalupe Coyote Resource Conservation District.
- Loma Prieta Resource Conservation District.
- Pacific Gas and Electric Company.
- Pacheco Pass Water District.
- Pacheco Storm Drainage & Maintenance District.
- San Martin County Water.
- West San Martin Water Company.
- Santa Clara County Lighting Service Area.
- Santa Clara County Open Space Authority.
- Santa Clara County Vector Control District.
- South County Regional Wastewater Authority.
- South Santa Clara County Fire Protection District.
- South Santa Clara Valley Memorial District.

[5] Private entities may be able to opt-in to the Plan through a separate process described in Section 6.7.2 *Application Process for Private Projects.*

[6] To join the Plan, a city or county would need to amend the Plan using the process described in Chapter 10.

- Sunol Sanitary District.

The Participating Special Entity will submit a complete application for the proposed activity directly to the Implementing Entity with copies to the local jurisdiction in which the project occurs, and the Wildlife Agencies. This application will contain the following components.

- A detailed description of and rationale for the activity proposed for coverage under the Habitat Plan.
- Proposed avoidance and minimization measures to be applied to the covered activity (see Chapter 6).
- A map of the proposed activity area.
- An analysis of the potential impacts of the proposed activity on covered species and their habitats.
- All components of the Habitat Plan application package (described in Chapter 6).
- In order to grant take authorization to these local agencies, the Implementing Entity will need a legally enforceable contractual relationship with the Participating Special Entity. The Implementing Entity will issue, at its discretion, a Certificate of Inclusion to the Participating Special Entity that will allow the proposed activity to be covered under the Habitat Plan if it finds that the conditions listed below are met.
- The Implementing Entity signs a contract with the Participating Special Entity binding it to the relevant terms of the permits, Implementing Agreement, and Habitat Plan[7].
- The proposed activity complies with all terms and requirements of the Plan, the permits, and the Implementing Agreement, and the Wildlife Agencies concur.
- The impacts of the proposed activity fall within those analyzed in the Habitat Plan, the ESA Section 7 biological opinion for the Habitat Plan, and the EIR/EIS in general type, location, magnitude, and effects.
- The impacts of the proposed activity do not deplete the amount of take coverage to such an extent that not enough is available for future covered activities.
- The proposed activity does not conflict with the conservation strategy or the ability of the Implementing Entity to meet the Plan goals and objectives.

As described above, the Wildlife Agencies must approve the inclusion of the Participating Special Entities.

The Certificate of Inclusion will be issued to the Participating Special Entity by the Implementing Entity upon payment of the fee specified in the contract and completion of any other steps required by contract to occur prior to issuance of

[7] In the event of failure to uphold the terms of the permit, Implementing Agreement, and Habitat Plan, the contract gives the Implementing Entity the ability to force action by the Participating Special Entity through legal means.

the Certificate of Inclusion. The Implementing Entity may require Participating Special Entities to pay fees over and above those specified in Chapter 9 to cover indirect costs of extending permit coverage under the Habitat Plan, including the costs of Implementing Entity staff time to assist with permit coverage, a portion of the costs of the initial preparation of the Plan, and a portion of the costs of conservation actions designed to contribute to species recovery. The Certificate of Inclusion will include an attached map depicting the parcel number, acreage, and owner of lands to which the take authorization(s) would apply. A template of the Certificate of Inclusion will be provided to the Wildlife Agencies for review and approval during Plan implementation, before the first Participating Special Entity is approved. Also see the Implementing Agreement for additional details and procedures that apply to Participating Special Entities. The Implementing Entity will track the amount of take authorization extended to Participating Special Entities against the total allowable take authorized under this Plan.

As described in Chapter 4, some management and monitoring activities will result in take of the covered species, even if the net result of the actions are beneficial (e.g., prescribed burning, handling species to identify or mark them). Any special district or other agency that carries out such activities on behalf of the Implementing Entity will require take authorization. If the special district or agency is either a Permittee itself, or carries out management and monitoring activities on Plan preserves as a contractor of the Implementing Entity, it will receive take authorization under the Habitat Plan permits. Management or monitoring agencies that are not a Permittee or a contractor of the Implementing Entity can secure take authorization as a Participating Special Entity.

8.4.1 San Martin

The unincorporated community of San Martin, located between Gilroy and Morgan Hill, has been interested for several years in incorporating as a new jurisdiction. If this occurs during the permit term, a new town of San Martin would not be covered by the permits. To allow use of the Habitat Plan by a new jurisdiction in the permit area, the Permittees would need to amend the permits, the Plan, and the Implementing Agreement to include this new jurisdiction. The Habitat Plan already anticipates growth within San Martin as part of County jurisdiction. If future growth plans of a new jurisdiction of San Martin are consistent with the impacts anticipated in the Habitat Plan, a Plan amendment is expected to be straightforward. Any new jurisdiction would not be able to use the Participating Special Entity process for take coverage under the Plan.

8.5 Local Implementing Ordinances

To implement the Habitat Plan on the local level, each participating jurisdiction must adopt an implementing ordinance that will reference the permits, Implementing Agreement, and Habitat Plan and the jurisdiction's obligations under the Plan. Ordinances will be considered for adoption by each jurisdiction

no later than 120 days after execution of the Implementing Agreement and issuance of the last permit by the Wildlife Agencies. A draft template for a Habitat Plan implementing ordinance is provided in **Appendix B** as an attachment to the Implementing Agreement.

The permits will be contingent upon the adoption of local implementing ordinances in Gilroy, Morgan Hill, San José, and the County. The Implementing Agreement and permits will specify that the permit is contingent upon the adoption of these implementing ordinances. This will allow the Wildlife Agencies to make a finding that the Plan is adequately funded, contingent upon the adoption of the implementing ordinances.

8.6 Land Acquisition

The Implementing Entity is responsible for ensuring acquisition of land for the Reserve System in accordance with the requirements in Chapter 5 (summarized in the Acquisition Actions in **Table 5-2a**). As described in Chapter 5, all land for the Reserve System must be acquired by Year 45 of the permit term. To be incorporated into the Reserve System and count toward the land acquisition requirements of the Plan, acquired lands must meet the following criteria.

- Contribute to meeting the goals and objectives of the Plan and overall success of the Habitat Plan as described in Chapter 5.
- Have a location, configuration, and quality consistent with the reserve design and assembly principles in Chapter 5, Section 5.2.3 *Reserve System*.
- Land acquired must meet multiple criteria in Chapter 5 for landscape linkages, land cover types, plant occurrences, modeled species habitat, selected wildlife species occupancy, and other land acquisition criteria.
- Permanently protect the biological functions and values that contribute to the Plan. Permanent protection must be ensured through a conservation easement consistent with the requirements of Section 8.6.3 *Conservation Easement* or by some other permanent dedication of land to the Reserve System[8].
- Be managed in perpetuity according to a reserve unit management plan as described in Chapter 5, Section 5.2.5 *Land Management*. Acquisitions may be counted toward meeting the obligations of the Plan before the reserve unit management plan has been completed if the Implementing Entity owns the land or if the property owner is bound by a conservation easement or other agreement that requires preparation of a management plan consistent with the requirements of the Plan. Management in perpetuity will be ensured through the conservation easement or title record.
- Be monitored according to the requirements and guidelines in Chapter 7.

[8] For example, as described in Chapter 9, Section 9.4.2, up to 1,000 acres of the Reserve System may be met by incorporation of existing Open Space Authority lands that qualify as Type 1 open space. Some or all of these lands may be incorporated without conservation easements; see Section 9.4.2 for details.

- Have no hazardous materials or property encumbrances that conflict with Habitat Plan goals and objectives.
- Is not mitigation for a project or activity that is not covered by the Plan.

The land acquisition process will follow the steps listed below for land acquired in fee title or through conservation easements. All Permittees will have the opportunity to review land acquisition proposals as part of the Implementing Entity. Steps 1 through 16 apply if the Implementing Entity initiates contact with potential landowners. Steps 3 through 16 apply if a landowner contacts the Implementing Entity. These steps are also illustrated in **Figure 8-3**. The Implementing Entity could perform these steps on its own or they could be accomplished by an acquisition partner (e.g., a local land management agency).

1. Identify sites that have the potential to meet acquisition requirements for particular land cover types, plant occurrences, landscape linkages, or Conservation Analysis Zones, or to support suitable and occupied habitat for covered wildlife.
2. Approach property owner with proposal to acquire land through conservation easement or fee title.
3. If property owner is willing, secure concurrence from owner for pre-acquisition assessment of site. If a site visit is not feasible, conduct pre-acquisition assessment of site based on air photo analysis and available regional data sets (e.g., Habitat Plan data, CNDDB, etc.).
4. Conduct necessary pre-acquisition assessment at the Implementing Entity's expense of land cover types, habitat for covered species, and presence of covered species. The Implementing Entity will develop standard protocols and a report template for pre-acquisition assessment prior to the first acquisition during implementation.
5. Determine if site meets Plan acquisition requirements. Through the due diligence process, ensure that property encumbrances (e.g., existing easements, rights-of-way, property title, resource extraction rights, presence of hazardous materials or archaeological or cultural sites) do not conflict with Plan goals and objectives. For easements, reach agreement on easement terms and any necessary management prior to purchase, where possible. Areas subject to incompatible easements or management will be excluded from the reserve system until those incompatibilities are resolved.
6. Discuss proposal to acquire property with Wildlife Agencies at a Technical Advisory Committee meeting or other venue (discussions may need to be confidential). The Implementing Entity will discuss land acquisition proposals with the Wildlife Agencies early in the process.
7. Conduct appraisal of property value (easement or fee) and water rights consistent with legal requirements for acquisition of public lands.
8. Rank available sites on the basis of cost versus ability to meet Plan requirements and biological goals and objectives. Sites that meet specific requirements, goals, and objectives that are generally difficult to fulfill should be assigned a high priority.

9. Obtain concurrence from CDFG and USFWS for all land acquisition. Wildlife Agencies have 30 days to respond to request for approval once all relevant and available information has been provided to them. If after 30 days there has been no response from an agency, the Implementing Entity will assume approval from that agency.
10. For high-ranking sites, make offer to property owner and develop easement conditions, if appropriate. Easement conditions should contain the framework of the expected management of the site that will be documented in more detail later in the reserve unit management plan.
11. Negotiate fair-market price and easement conditions, if applicable, with owner.
12. If a site is purchased in fee title, the Implementing Entity will prepare a reserve unit management plan for the site based on site conditions if the site is the first parcel in the reserve unit (see Chapter 5 for the six units). If the site is part of an existing reserve unit, the reserve unit management plan will need to be updated to incorporate the new site. If a conservation easement is purchased, the Implementing Entity will prepare a management plan with the landowner (although easement negotiations may resolve some management issues). Management plans will be consistent with the Plan's conservation strategy and the framework for adaptive management.
13. Examine all leases that apply to the property for consistency with Plan goals and objectives. Inconsistent leases may be terminated or modified to conform with the Plan. Areas subject to incompatible leases will be excluded from the Reserve System until these leases expire.
14. If acquired in fee title, assess structures and facilities on the property for hazards, covered species, and other values such as educational purposes, land management facility, or cultural or historic significance. Repair or demolish structures or facilities, as appropriate, to reduce public hazards or stabilize functions (e.g., repair of gates and fencing).
15. Initiate reserve management and monitoring according to approved reserve unit management plan.
16. Conduct habitat restoration, if applicable.

8.6.1 Stay-Ahead Provision

The conservation strategy of an NCCP must be implemented at or faster than the rate at which impacts on habitat or covered species occur so that conservation always stays ahead of impacts and rough proportionality is maintained between impacts on habitats or covered species and conservation measures (California Fish and Game Code 2820(b)(3)(B). The rough proportionality standard of the NCCP Act states that

> "…implementation of mitigation and conservation measures on a plan basis is roughly proportional in time and extent to the impact on habitat or covered species authorized under the plan. These

> provisions shall identify the conservation measures, including assembly of reserves where appropriate and implementation of monitoring and management activities, that will be maintained or carried out in rough proportion to the impact on habitat or covered species and the measurements that will be used to determine if this is occurring" (California Fish and Game Code 2820(b)(3)(D)(9)).

Similarly, the ESA also requires that HCPs minimize and mitigate the impacts of the taking to the maximum extent practicable (ESA Section 10(a)(2)(B)(ii)). When conducting their jeopardy analyses, USFWS will consider whether the mitigation proposed is scientifically and rationally related to the impact of the taking. In order to make findings that the proposed impacts are mitigated to the maximum extent practicable, USFWS will consider temporal losses (if any) resulting from the time of impact relative to the time of mitigation.

The *Stay-Ahead provision* requires that the amount of each land cover type conserved, restored, or created by the Implementing Entity as a proportion of the total requirement for each land cover type (**Tables 5-11 and 5-13**) must be roughly proportional to the impact on that land cover type as a proportion of the total impact expected by all covered activities (**Table 4-2**). For example, if 25% of the expected impacts on mixed serpentine chaparral have occurred, then at least 25% of the required land acquisition for mixed serpentine chaparral must also have occurred.

To provide flexibility during implementation, the Implementing Entity may fall behind by a maximum of 10% of its conservation strategy requirements (conservation overall and by each applicable land cover type) and still be in compliance with the Stay-Ahead provision for this Plan. This deviation accounts for the likely pattern of infrequent land acquisition of large parcels that will allow the Implementing Entity to jump far ahead of impacts with just one acquisition. **Figure 8-4** illustrates how the Stay-Ahead provision works for land acquisition in two theoretical cases. **Figure 8-4a** shows the pattern of land acquisition required if the rate of impact occurs at a constant rate throughout the permit term. **Figure 8-4b** illustrates how conservation must occur quickly if impacts occur during the beginning of the permit term. In both cases, the Implementing Entity is allowed a 10% deviation from the required trajectory of conservation. However, once the permits end (i.e., through expiration, suspension, revocation), the Permittees will be held responsible for any outstanding requirements in the permits, Implementing Agreement, and Habitat Plan (see the Implementing Agreement for a detailed discussion).

The Stay-Ahead provision also includes a requirement for acquisition of covered plant occurrences to stay ahead of impacts to these species (**Table 5-16**)[9]. The Stay-Ahead provision applies to each covered plant species separately (i.e., impacts to and conservation of covered plant occurrences cannot be aggregated for purposes of Stay-Ahead).

[9] Exceptions to this are described for the Coyote ceanothus in Chapter 5, Section 5.4.11.

Measurement of Stay-Ahead Provision

During the first year after permit issuance, the Implementing Entity will be establishing its structure, collecting initial Habitat Plan fees, and actively pursuing land acquisition deals with willing landowners. To allow time for these start-up tasks to occur, the Stay-Ahead provision will only apply two years after the last local ordinance takes effect. After two years of Plan implementation, the Implementing Entity must measure its compliance with the Stay-Ahead provision by the following method. To measure compliance with the Stay-Ahead provision, land cover types are aggregated by natural communities (see groupings in **Table 3-1**). The amount of each natural community conserved, restored, or created as a proportion of the total requirement by natural community must be equal to or greater than the impact on the natural community as a proportion of the total impact expected by all covered activities. For example, if 40% of the total expected impacts on oak woodland land cover types have occurred, then at least 40% of the conservation of all oak woodland land cover types must also occur. This method of aggregating land cover types only applies to the measurement of the Stay-Ahead provision (requirements for acquisition by each land cover type [**Tables 5-11 and 5-12**] still apply and must be met by Year 45 of the permit term or by Year 40 if restoration or creation are to occur). This aggregation method provides incentives and flexibility to the Implementing Entity to acquire, restore, or create the most sensitive and difficult land cover types first within each natural community, even if impacts to these land cover types have not yet occurred.

Land acquired or funded in full or in part by state or federal agencies to contribute to species recovery under this Plan will also contribute to compliance with the Stay-Ahead provision. A portion of the Plan assumes funding by the state and federal governments. The Implementing Entity must recognize, however, that funds from public agencies will be available on budget cycles, and subject to administrative processes, that may or may not correspond to the timing of covered activities. Therefore, the Implementing Entity must acquire land and implement other conservation actions on its own and cannot rely on the timely availability of state or federal funds to implement these actions.

The Implementing Entity will monitor the status of the Stay-Ahead provision throughout Plan implementation. The Stay-Ahead provision will also be evaluated on an annual basis by the Wildlife Agencies. Beginning with the Year 2 annual report, the Implementing Entity will report on the status of the Stay-Ahead provision. As long as the pace of conservation measure implementation (i.e., preservation, restoration, or creation) does not fall behind the pace of covered activity impacts by more than 10% , the Stay-Ahead provision will have been satisfied.

If the Plan is found to be out of compliance with the Stay-Ahead provision, the Wildlife Agencies will determine if the Plan has maintained rough proportionality. If any of the Wildlife Agencies issue a notification to the Implementing Entity that rough proportionality has not been met, then the Wildlife Agencies and the Implementing Entity will meet to develop a plan to remedy the situation.

Land Acquisition and Restoration Credit

The criteria for incorporating land into the Reserve System are described above. Land may be counted toward Plan requirements and the Stay-Ahead provision once it is incorporated into the Reserve System and if the lands are compatible with Plan goals and objectives. Infrastructure described as part of the Reserve System in Section 2.3.8 *Conservation Strategy Implementation* is assumed to be compatible with the Plan goals and objectives if it is implemented consistent with the conditions on covered activities described in Chapter 6, including Condition 9 *Prepare and Implement a Recreation Plan*. Existing and newly constructed infrastructure within the Reserve System does not count toward land cover type land acquisition requirements described in Chapter 5, but it does count toward the total Reserve System size requirements.

Compliance for land cover types for which restoration or creation are required will be measured when construction is completed. However, if the project fails to meet the success criteria developed during implementation for each site, the compliance credit will be revoked.

The Implementing Entity will receive credit for existing wetland land cover types that are part of the Reserve System except where wetland functions are degraded by their proximity to urban development. The thresholds for wetland preservation credit are described in Chapter 5 and in **Table 5-15**.

A key requirement of the land acquisition strategy is landscape connectivity and connections to existing open space. Land acquired early in the permit term may be isolated from existing open space until future acquisitions can connect it. Such acquisitions are eligible for credit under the Plan and for the Stay-Ahead provision. If it is clear later in the permit term that land acquired, in part, for connectivity purposes cannot be connected to existing Types 1–3 open space, compliance credit under the Plan will be revoked for the linkage requirement (other credit will remain).

Any rights-of-way or utility easements that are maintained or used regularly cannot be credited towards land acquisition requirements because of the disturbance that occurs within these areas. It is the responsibility of the Implementing Entity to document the frequency and type of use in these rights-of-way or easements to justify whether land acquisition credit should be applied in these areas.

Land cover restored or created can receive credit for restoration or creation and preservation (see Chapter 5 for land cover restoration and creation requirements, and how credit is applied). If the restoration/creation project occurs after recordation of the conservation easement (i.e., after preservation credit is assigned), the acreage of the restoration/creation project will be subtracted from the preserved land cover types that the project replaces. For example, a site that supports 100 acres of annual grassland is preserved by the Implementing Entity. When the conservation easement is recorded, the Implementing Entity receives 100 acres of annual grassland credit towards the preservation requirements of the Plan. Five years later, a 1-acre pond is created on the site. When the pond

restoration project is completed (i.e., when construction is complete), 1 acre is subtracted from the annual grassland preservation credit for the site and applied to pond creation and preservation.

The Implementing Entity must document the conditions of the restoration site prior to initiating restoration in order to determine whether the project is enhancing or restoring the wetland according to the definitions in the Plan (see **Appendix A**). If the site is being enhanced, then only preservation credit can be applied. If the site meets the definition of restoration, then restoration and preservation credit can be applied.

Wetland restoration credit may change if the wetland type changes (e.g., a pond becoming a perennial wetland if cattails colonize and dominate the site) before success criteria are met. Final restoration and creation credit will be determined once the success criteria of the restoration project are met. In no cases will the total amount of credit exceed the ground area present.

The Plan makes sharp distinctions between some land cover types when, in reality in the field, there are often gradual gradients between land cover types. In cases where it is difficult to draw a boundary between land cover types, a qualified biologist or botanist will identify each land cover type based on field conditions and professional judgment.

Stay-Ahead Reporting and Process for Addressing Deficits in Land Conservation

The Implementing Entity will report the status of the Stay-Ahead provision in each annual report, beginning with the second annual report. If the Stay-Ahead provision is not met, the Implementing Entity and the Wildlife Agencies will meet and confer within 30 days of the annual report to assess the situation and develop and implement a mutually agreeable plan of action as described in the land acquisition actions (see Section 5.3.1 *Land Acquisition and Restoration Actions* in Chapter 5) and the Implementing Agreement to remedy the situation and achieve compliance with the Stay-Ahead provision. The mutually agreeable plan of action may include a range of potential solutions, including those listed below.

- Wait for key pending land acquisition deals to close that will bring the Plan into compliance with the Stay-Ahead provision.
- Speed delivery of funding sources or partnerships that will enable more land acquisition to bring the Plan into compliance with the Stay-Ahead provision.
- More aggressively solicit interest from key landowners who may be willing to sell land to the Implementing Entity that would enable compliance with the Stay-Ahead provision.
- Change the manner in which the Plan is implemented such as more direct acquisition of land by the Implementing Entity rather than relying on partnerships, shifting the Implementing Entity's budget allocations to place a

higher priority on land acquisition, or accelerating the process for being able to count land already acquired against Stay-Ahead requirements by, for example, recording easements more quickly.

- Require that project proponents provide land in lieu of fees (see below).
- Temporarily or permanently adjusting certain Plan provisions through an amendment or other process (e.g., the method for measuring compliance with the Stay-Ahead provision), with the approval of the Wildlife Agencies.
- Slowing or stopping take authorizations until conservation strategy obligations catch up with impacts.
- If, after the exercise of all available authority and utilization of all available resources, the Implementing Entity cannot comply with the Stay-Ahead provision, the Plan will be reevaluated, and an amendment may be warranted if adjustments to the take authorization, permit term, conservation obligations, or other aspects of the permits, Implementing Agreement, or Plan are necessary. See below for more information on the land in lieu of fee requirement when the Stay-Ahead provision is not being satisfied or is at risk of not being satisfied.

Requirements for Providing Land Instead of Paying a Fee When Stay-Ahead Provision Is Not Being Met

If the Implementing Entity determines the Plan is at risk of noncompliance with the Stay-Ahead provision, the Implementing Entity will notify the Permittees. The Implementing Entity may determine that it is necessary to temporarily require project proponents (including Permittees) to provide land (or perform equivalent conservation actions in Chapter 5) instead of paying a fee. However, if the Stay-Ahead provision is not satisfied based on the criteria discussed above, the Implementing Entity must notify the other Permittees that it is necessary to temporarily require project proponents to provide land instead of paying fees, unless the Wildlife Agencies agree, after conferring with the Implementing Entity, that a different plan of action developed in concert with the Implementing Entity will remedy the situation and it is not necessary to require project proponents to provide land instead of paying a fee. Alternatively, a Permittee may have accrued sufficient credits to offset any fees due.

If the Wildlife Agencies determine the Plan is at risk of noncompliance with the Stay-Ahead provision, they will so notify the Implementing Entity in writing, and the Implementing Entity and Wildlife Agencies will meet to develop a mutually agreeable plan of action that will fulfill such requirements. If the Wildlife Agencies determine that the requirements of Section 8.6.1 *Stay-Ahead Provision* have not been fulfilled, they may, by written notice to the Implementing Entity, require it to initiate the requirement to dedicate land in-lieu of fees.

Land will be provided to the Implementing Entity according to the guidelines and criteria in Section 8.6.7 *Land Dedication In Lieu of Development Fee*. Project proponents will always have the option of providing land in lieu of the base

development fee as long as the land offered meets the criteria in Section 8.6.7 *Land Dedication In Lieu of Development Fee*. If the Implementing Entity initiated the requirement due its own determination that the Plan was at risk of noncompliance, the requirement to provide land instead of a fee will be lifted (i.e., it will revert back to an option) as soon as the Implementing Entity determines that it is no longer at risk of noncompliance with the Stay-Ahead provision. If the Implementing Entity or Wildlife Agencies initiated the requirement following noncompliance with the Stay-Ahead provision, the requirement will be lifted as soon as the Implementing Entity demonstrates in writing to the satisfaction of the Wildlife Agencies that the Plan is in compliance with the Stay-Ahead provision.

Conservation Action Deadlines Beyond Stay-Ahead Requirement

As summarized above, the Implementing Entity is required to meet the Stay-Ahead provision so that land acquisition keeps pace with impacts. However, if impacts occur more slowly than expected, strict adherence to the Stay-Ahead provision would result in relatively slow growth of the Reserve System initially, followed by a rapid expansion of the Reserve System in order to meet the final acquisition targets. To ensure that the Implementing Entity makes steady progress towards the final land acquisition targets, in year 20 of implementation, the Implementing Entity will work with the Wildlife Agencies to conduct a formal and complete review of progress toward building the Reserve System. To ensure that the Implementing Entity makes steady progress towards final restoration/creation goals, interim deadlines are established in **Table 5-14** for each watershed in the study area. Section 5.3.6 *Riverine and Riparian Forest and Scrub Conservation and Management* also includes deadlines for riverine acquisition and restoration. The Stay-Ahead provision described above must always be followed.

Chapter 5 also establishes deadlines for conservation actions not related to land acquisition or habitat restoration/creation such as wildlife connectivity studies. See Chapter 5 for these additional deadlines that go beyond the Stay-Ahead requirement for land acquisition.

Rough Proportionality and Stay-Ahead for the Burrowing Owl Conservation Strategy

The Stay-Ahead requirement for the western burrowing owl conservation strategy is unique because the strategy includes a combination of land acquisition, conservation actions, and management agreements over 5,300 acres[10] of occupied and potential nesting habitat by Year 45. This requirement only applies to occupied and potential nesting habitat (not overwintering only habitat) because these two habitat types are the most critical in meeting the conservation

[10] 600 acres of the 5,300 acres must be permanently protected occupied nesting habitat.

strategy goal of increasing the adult burrowing owl population by three birds per year. The Stay-Ahead requirement for burrowing owl will be applied similar to the Stay-Ahead provision for the Reserve System as a whole, but the calculation will be based on acres of modeled occupied and potential nesting habitat either preserved or managed instead of acres of natural communities preserved. Although temporary management agreements can count toward the burrowing owl Stay-Ahead provision, all management agreements (up to 4,700 acres) must be permanent by Year 45. In addition, managed or permanently protected occupied nesting habitat must remain within 10% deviation of permanent impacts to occupied nesting habitat based on a 3:1 ratio (management or protection to impacts). For example, if 50 acres of permanent impacts to occupied nesting habitat have occurred, then 150 acres of occupied nesting habitat must be under a management agreement or permanently protected.

In addition, to account for the conservation actions that will be applied and to provide an incentive to implement them quickly, the Implementing Entity may credit another 5% of the Stay-Ahead requirement against implementation of conservation actions on managed lands. Together with the allowable 10% deviation, this provides up to a 15% allowance in meeting Stay-Ahead for western burrowing owl. For example, if 66 acres of the 198-acre impact cap for this species has been used (33%), then 1,767 acres (33% of 5,300 acres) must be under management agreement for this species. If necessary, this requirement could be reduced to 1,219 acres (23% of 5,300) to account for 10% allowable deviation. If conservation actions are being successfully applied as determined through consultation with the Wildlife Agencies, the Stay-Ahead requirement for management agreements could be reduced by up to another 5%, to 954 acres (18% of 5,300 acres).

8.6.2 Land Acquired by Other Organizations or through Partnerships

It is anticipated that substantial amounts of land for the Reserve System will be acquired by Permittees such as County Parks. SCVWD may also acquire land for the Reserve System. Land that meets the terms of the Plan would be credited towards land acquisition requirements in Chapter 5. In other instances, agencies and organizations who are not Permittees such as the Open Space Authority or local land trusts (e.g., The Nature Conservancy, Peninsula Open Space Trust) will acquire land in the study area that will help meet the goals and objectives of this Habitat Plan. In these cases, it may be appropriate that the Implementing Entity receive credit toward Plan requirements if the acquisitions are made in partnership with the Implementing Entity, they are consistent with Plan goals, and the lands are enrolled into the Reserve System through placement of a conservation easement. It is expected that the Implementing Entity will be involved in many of the land acquisitions in the study area during the permit term. However, the Implementing Entity may own little or no land itself. For example, if the Implementing Entity partners with other groups and provides matching funds, larger land acquisitions will be possible than if the Implementing Entity were to purchase the land on its own. Land acquired through partnerships

with non-Permittees can be counted toward the Habitat Plan conservation requirements (i.e., contribution to recovery) only if the acquisition meets the criteria for Reserve System lands described in Chapter 5 and the criteria described above in Section 8.6 *Land Acquisition.*

Credit will be determined based on the purpose and location of the acquisition, the management of the land acquired, and consistency with the conservation strategy of the Habitat Plan. The Plan budget assumes that the Implementing Entity will always fund management and monitoring on land in the Reserve System; actual funding will be determined on a case-by-case basis. Land acquired through partnerships could be managed and monitored by the Implementing Entity or by other groups or agencies as long as a contract or other binding agreement is in place to ensure that management and monitoring occurs according to the terms of the Plan. Land acquired with state or federal money will be credited toward the state/federal contribution discussed in Section 9.4.3 *State and Federal Funding* (Chapter 9). All acquisitions credited toward the land acquisition requirements of the Plan can be credited toward the Stay-Ahead provision as discussed in Section 8.6.3 *Conservation Easements* above, regardless of who manages the property and regardless of the source of funding for acquisition or management.

Land Acquisition during Plan Development (Interim Conservation)

Open space agencies and organizations in the study area have been acquiring land during Habitat Plan development. Consistent with the NCCP Act Section 2810(b)(8) and the Planning Agreement, parcels or portions of parcels acquired after approval of the Planning Agreement (October 2005) can be counted toward meeting Plan requirements according to the procedures and criteria described above for lands acquired by other organizations or through partnerships. In addition, lands acquired during Plan development can only be credited against Plan requirements to the extent the land is acquired without mitigation funds. If an acquisition occurs using some mitigation funds, only that portion of the acquisition funded by non-mitigation funds can be credited towards the Plan. The Implementing Entity may expend funds to augment management of these interim purchases if the augmentation is necessary to provide credit toward Plan land acquisition requirements.

Lands acquired during Plan development that may be counted toward Plan requirements must meet the criteria outlined in Section 8.6 *Land Acquisition* above. Likely interim land acquisitions are listed in **Table 5-5** and shown **Figure 5-4**. Other lands conserved during Plan development may not appear in **Table 5-5** or **Figure 5-4** if the conservation action took place during production of the final Habitat Plan or if preparers of the Plan were not aware the property had been conserved. Such lands may be counted toward Plan requirements using the same criteria described in this section.

Private Mitigation Banks

A mitigation bank is privately or publicly owned land that is managed for its natural resource values. Mitigation banks may sell species credits, wetland credits, or both. The bank sells credits to private or public project proponents to offset their impacts, and the money is used to improve and maintain the resources. Conservation banks must be approved by USFWS and CDFG (and the Corps if the bank is also selling jurisdictional wetland credits). In exchange for permanently protecting the land, the bank operator is allowed by the Wildlife Agencies to sell species credits to developers who need to satisfy legal requirements for compensating for the impacts of projects that affect listed species or their habitat[11]. A conservation or mitigation bank is a free-market enterprise that performs the following functions.

- Offers landowners economic incentives to protect natural resources.
- Saves project proponents' time and money by providing them with the certainty of preapproved compensation lands.
- Provides for long-term protection and management of habitat.
- The goals of private mitigation banks are similar to those of regional HCPs or NCCPs, including this Plan.

Credits sold by private mitigation banks within the permit area can count toward the Habitat Plan if they are consistent with the conservation, monitoring, adaptive management, and other relevant provisions of the Plan. For the bank to be eligible to sell credits to project proponents (public or private) with activities covered by the Habitat Plan, the bank must meet all of the relevant standards of habitat enhancement, adaptive management, and monitoring outlined in Chapters 5 and 7. All impacts and mitigation for impacts covered under the Habitat Plan must occur within the permit area analyzed in USFWS's biological opinion for the Habitat Plan. Similarly, CDFG policy requires all impacts and mitigation to occur within the permit area. As such, mitigation banks located outside of the permit area may not be used.

Mitigation bankers wishing to establish a bank whose credits can count toward Habitat Plan requirements must notify the Wildlife Agencies to allow consideration of such provisions during bank development and agency approval. Bankers must also coordinate closely with the Implementing Entity to help ensure the bank's consistency with the Habitat Plan and use by Habitat Plan Permittees.

There are currently no approved conservation or mitigation banks in the study area. A bank near Gilroy on Lucky-Day Ranch is currently being proposed to USFWS and CDFG. There are several banks in adjacent counties whose service area extends into the study area. Credits sold by banks located outside the permit area cannot count toward Plan goals or Plan fees even if the bank's service area extends into the permit area.

[11] For additional information on banking see: www.dfg.ca.gov/hcpb/conplan/mitbank/mitbank.shtml.

8.6.3 Conservation Easements

Conservation easements will be used as an important tool in Plan implementation in three ways:

- Conservation easement placed on land or watercourses acquired in fee title by the Implementing Entity or one of its land acquisition partners to secure credit under the Plan (see Section 8.6 *Land Acquisition*).
- Conservation easement purchased from a private party and placed on the land or water still owned by the landowner (i.e., as an alternative to fee title acquisition).
- Conservation easement placed on land or water in public ownership at the time of permit issuance.

This section describes the process for developing acceptable conservation easements in all three cases. These guidelines and rules will be used by the Implementing Entity or by its partners acquiring conservation easements on behalf of the Implementing Entity with Habitat Plan funding.

All conservation easements acquired to meet the goals of the Habitat Plan will be in perpetuity and in accordance with California Civil Code Sections 815 et seq.[12] as well as the current policies of the Wildlife Agencies. All conservation easements will be voluntarily offered by the holder of the underlying fee. The conservation easements will be dedicated to the Implementing Entity or to another conservation organization (e.g., California Rangeland Trust, The Nature Conservancy) if that organization is approved by the Implementing Entity, the Wildlife Agencies, and the landowner. In addition, a binding agreement must exist between the Implementing Entity and the easement holder to ensure compliance with the permits, Implementing Agreement, and Plan. An objective of the easements is to have consistency in enforcement, monitoring, and maintenance. Conservation easements on land owned by the Implementing Entity must be held by another conservation organization.

USFWS and CDFG will be named as third party beneficiaries on all conservation easements. To ensure compliance with the Plan, all conservation easements will follow the template easement in **Appendix H** as close as is reasonably possible. Reasonable variations from the template may be needed to address site-specific constraints. CDFG and USFWS, along with the Implementing Entity, must review and approve any modifications to the template easement.

It is the responsibility of participating landowners to abide by the terms of these conservation easements. The terms and prices of conservation easements will be negotiated on a case-by-case basis between the landowner and the Implementing Entity. The specific terms of the conservation easement will be developed on a case-by-case basis depending on site conditions, landowner preferences and operations, and species and habitat needs. Some landowners may wish to reserve

[12] This section of California law allows placement of restrictions on the use of land for conservation purposes that is binding on all successive owners of that land.

a portion of their property for uses that are incompatible with the Habitat Plan such as a home site or a recreational facility with high intensity use. In these cases, the conservation easement may either exclude the incompatible site or apply to the entire property but define the portion of the site in which the incompatible uses are allowed[13]. The Habitat Plan will only receive credit for the portion of the property that is compatible with Plan goals and objectives.

Each conservation easement for the property or portion of the property that will be incorporated into the Reserve System will be drafted to:

- ensure that the property will be kept in its natural or existing condition (all or portions of the site may also be enhanced or restored),
- protect the existing, enhanced and/or restored conservation values of the property forever,
- ensure that the easement cannot be extinguished without the prior written consent of the Implementing Entity and the identified third party beneficiary Wildlife Agencies,
- confine the allowable uses of the property to those activities that do not interfere with the preservation or enhancement of those conservation values consistent with the Plan, and
- prevent any use of the property that would impair or interfere with the conservation values of the property.

The conservation values will be specifically described in terms of covered species and their habitat, as well as other land cover types and natural communities on the property. Conservation values will be described, at a minimum, using the land cover types and covered species habitat described in Chapter 3 and **Appendix D**. A legal description and map must be included in the easement.

Each conservation easement will prohibit certain activities as described in the Template Conservation Easement (**Appendix H**), except as necessary to meet the biological goals and objectives of the Plan (including infrastructure required to support monitoring, management, and maintenance) or to provide recreational services consistent with the Plan (see Chapter 6, Section 6.4.6, subheading *Condition 9. Prepare and Implement a Recreation Plan*). These allowances will be described in the reserve unit management plan that will be developed by the Implementing Entity. In addition, all recorded conservation easements must include or incorporate by reference the items listed below.

- The initial pre-acquisition assessment of covered species habitat and natural communities present.
- A detailed list of the allowable uses and use restrictions on the parcel, consistent with the minimum requirements stated above.

[13] There may be advantages to having the conservation easement apply to the entire site, for example, to avoid costly boundary surveys needed to define the conservation easement more narrowly than the property boundary.

- Any mandatory terms and conditions to maintain or enhance the habitat pursuant to Section 5.2.5 *Land Management* of this Plan.
- Provisions for access by the Wildlife Agencies and the Implementing Entity or its designee to monitor compliance with the terms of the conservation easement and to carry out all applicable management and monitoring requirements described in Chapter 5 and Chapter 7, respectively.
- The allowances or restrictions on public access and recreation on the site, compatible with the conservation goals of the Plan, *Condition 9 Prepare and Implement a Recreation Plan for each Reserve Subunit* in Chapter 6, Section 6.4.6, and landowner wishes.
- Conservation easements on grazing lands will describe the general nature of the grazing to be allowed. The easement will specify the desired vegetation and other habitat conditions and, if necessary, impose limits on the timing, stocking density, and duration of permitted grazing to meet those conditions. These desired conditions and grazing limitations will be allowed to fluctuate according to the adaptive management process. A baseline condition will be described to provide a benchmark to measure habitat enhancement on the site. The conservation easement may accomplish this requirement by reference to a separate reserve unit management plan prepared for the lands covered by the easement.
- The conservation strategy does not call for acquisition of cultivated agricultural land. However, conservation easements on cultivated agricultural land may accompany acquisitions that primarily service other strategic objectives. If cultivated agricultural land is acquired, the conservation easement will ensure that the land meets one or more biological goals and objectives of the Plan. If the site contains aquatic or riparian habitat that supports or could support covered species, the conservation easement will also generally describe measures to maintain or enhance those habitats. The conservation easement may accomplish this requirement by attaching or referencing a separate reserve unit management plan prepared for the lands covered by the easement. Alternatively, if the reserve unit management plan is prepared later, it may contain additional detail on site enhancement.
- Conservation easements will take into account issues of water use efficiency and runoff into adjacent or nearby streams and their potential effects on covered species, if applicable.
- Provisions for enforcement and available remedies for the Implementing Entity or appropriate other party in the event that title holder or third party violates the terms of the conservation easement.
- If the easement boundaries are different from the parcel boundaries, a legal description and map will accompany the easement.
- When a reserve unit management plan is prepared for private property according to Section 5.2.5 *Land Management*, the Implementing Entity will record a Memorandum of Unrecorded Reserve Management Plan, indicating where that reserve unit management plan may be found and that the terms of such reserve unit management plan will be followed. Such a title record

ensures that the reserve unit management plan will be tied to the conservation easement in the event property ownership changes. The title record also ensures management of the site in perpetuity.

To approve and accept a conservation easement, the Implementing Entity must have the following documentation.

- A pre-acquisition assessment of the property summarizing the baseline biological conditions including the presence and condition of natural communities and the presence and condition of covered species, if known (a complete biological inventory of the site would be conducted after the easement is recorded).
- A preliminary title report and legal description of the property.
- Assurance that any superior liens or interests will not substantially conflict with the property's conservation values.
- Evidence of all other easements, covenants, restrictions, reserved rights, and other property interests (including water rights).
- A clean Phase I environmental analysis for hazardous materials.
- A map and description of the parcel and its physical condition (e.g., roads, buildings, fences, wells, other structures) and its relation to other components of the Reserve System and other properties subject to other permanent protections for conservation purposes.
- A Property Analysis Report (PAR) or comparable assessment of the initial capital costs and ongoing management funds required to manage and monitor the lands (e.g., applicable components of Habitat Plan cost estimate).

Easements on Land Acquired by or for the Implementing Entity

As described in Section 8.6 *Land Acquisition*, the Implementing Entity must secure permanent protection of a property in order to receive credit under the Plan. If the land is owned by the Implementing Entity or a Permittee, a conservation easement must be placed on the site to ensure permanent protection. For lands acquired for the Reserve System but owned by other public entities, permanent protection must also be ensured by a conservation easement consistent with the requirements of Section 8.6.3 *Conservation Easements*. In either case, conservation easement terms will be consistent with those described in this section.

Easements on Private Land

This Plan assumes that the Implementing Entity and its partners will purchase some of the land for the Reserve System in conservation easements rather than in fee title. For example, conservation easements are appropriate where landowners

wish to remain on the property and the Plan's conservation goals can still be met with an easement. Conservation easements have been used throughout California to preserve farms, ranches, and the working landscapes that they support. The conservation easements purchased by the Habitat Plan Implementing Entity are intended to preserve the natural features of a property. However, as a secondary benefit, these easements are also expected to protect working landscapes of all kinds throughout the study area. Only portions of properties that meet one or more of the goals of the Plan will be credited to the Plan as part of the conservation strategy. In some cases, an easement may be placed over more of a property than initially credited with the hope that other portions of the property may be restored or enhanced to accommodate Plan goals in the future. Additional credit may be applied to these other sites once they meet Plan goals.

Some ranchers may prefer selling a conservation easement to selling their land in fee title so they can remain on their land and continue to conduct livestock operations. Livestock grazing will be an important management tool in the Reserve System (see Chapter 5), so this use is likely to be compatible with the conservation goals of Plan and therefore suitable for conservation easements.

Easements on Existing Public Lands

As described in Chapter 5, one component of the conservation strategy is to enhance the management and monitoring of high-value sites on existing public lands within County Parks and the Open Space Authority (**Table 5-5**). The Habitat Plan will provide additional funds or staff to these agencies to perform specific management and monitoring tasks in selected park units that will substantially benefit the covered species and natural communities. To ensure that these sites will be managed in perpetuity to benefit the covered species, the Plan proposes permanent conservation easements that allow recreational uses compatible with the conservation strategy of the Plan on approximately 12,000 acres of the County park lands identified and described in **Table 5-5** and illustrated in **Figure 5-4**. These sites will be enhanced to support the Habitat Plan and will be incorporated into the Reserve System.

Credit will be applied to the Habitat Plan once sites on existing public lands are placed under a conservation easement or other permanent dedication that is consistent with the easement requirements described in this section.

8.6.4 Grazing Leases, Licenses or Contracts within the Reserve System

Livestock grazing is an important management tool that benefits some terrestrial covered species. As a result, managed livestock grazing is expected to be used extensively in the Habitat Plan Reserve System. Existing grazing leases or

licenses[14] on a newly established reserve acquired in fee title will continue until a reserve unit management plan is prepared and approved by the Implementing Entity and the Wildlife Agencies. After the reserve unit management plan is approved, all grazing leases or licenses on the reserve will be reviewed by the Implementing Entity for consistency with the reserve unit management plan and with the terms of the Habitat Plan. If necessary, leases or licenses will be revised and brought into compliance with the Plan's conservation strategy and the framework for adaptive management to the extent allowable by the terms of the lease. Areas covered by incompatible leases will be excluded from the Reserve System until the incompatibilities are resolved. If land is acquired in fee title from a landowner who is also the grazing operator, the Implementing Entity will maintain the previous grazing regime with a willing former landowner (e.g., through a short-term lease) until a reserve unit management plan is prepared and approved by the Implementing Entity and the Wildlife Agencies. Once approved, this reserve unit management plan will establish the grazing regime on the site, which can then be incorporated into long-term grazing leases.

If livestock grazing is introduced to a reserve acquired in fee title or if the preexisting grazing lease or license expires, the Implementing Entity or other Permittee agency (e.g., County Parks) will enter into a lease agreement or license with the livestock operator. A contract may be necessary in the event that the livestock operator is paid by the Implementing Entity to graze livestock (e.g., when grazing a small site or using a prescription that does not provide an economic return to the operator). The contract, lease agreement, or license will specify the desired vegetation and other habitat conditions and impose limits on the timing, stocking density, and duration of permitted grazing to meet those conditions. Grazing contracts, leases, or licenses will be reviewed annually with the operator to adjust grazing practices to best meet habitat goals. At the expiration of the contract, lease, or license, the Implementing Entity will review monitoring data to determine whether the contract, lease, or license should be reissued with no changes in grazing management, reissued with changes in the grazing regime, or not reissued. All new and renewed contracts, leases, or licenses will include the following conditions of agricultural use and covenants to protect resources.

- Grazing capacity and stocking rates.
- Evaluation of fencing of riparian areas.
- Residual dry matter guidelines.
- Conditions under which the desired stocking rate can be changed or exceeded (e.g., seasonal adjustments to maintain habitat quality, annual adjustments in response to rainfall).
- Grazing and livestock practices.
- Pest control restrictions.
- Reporting requirements.

[14] A lease is a short- or long-term contract for use of a property, whereas a license is a short-term permit allowing use under an established program. Both leases and licenses may be applicable to livestock grazing in the study area.

The lease agreement will also outline the responsibilities of each party for maintaining reserve infrastructure (e.g., fences, watering facilities). In addition to maintenance of reserve infrastructure, lease agreements will also include the responsibilities of the grazing lessee to maintain or meet desired habitat conditions. Responsibilities of the grazing lessee may include, but are not limited to:

- Fence repair and maintenance;
- Weed control, including any necessary herbicide application;
- Feral pig management; and
- Pond maintenance.

Other maintenance actions may be included in the lease agreements if deemed appropriate by the Implementing Entity. Costs to perform these actions are included in the cost model assumptions (see Chapter 9, and **Appendix G**).

8.6.5 Willing Sellers

A key principle of the Habitat Plan is that land will only be acquired by the Implementing Entity for the conservation strategy from willing sellers. This principle will be strictly followed; the Implementing Entity will not condemn land from unwilling sellers in order to meet Plan conservation requirements. Likewise, the Implementing Entity will not partner or contract with a separate agency to condemn land from unwilling sellers for the Habitat Plan, nor will it contribute funding toward a condemnation from an unwilling seller.

Nothing in the Habitat Plan will prevent other organizations from exercising their powers of eminent domain for purposes other than implementation of the Habitat Plan and with funds other than those raised as a result of this Habitat Plan. If subsequent to such a condemnation, and after soliciting input from the Public Advisory Committee, the Implementation Board of the Implementing Entity finds that the condemned lands are integral to the successful implementation of the Habitat Plan, the Implementing Entity may seek agreement with the owner of the condemned lands to manage those lands in a manner consistent with the Habitat Plan.

Given the many land acquisition requirements in Chapter 5 (see Section 5.3.1 *Land Acquisition and Restoration Actions*), it is possible that one or several landowners who own key resources of interest to the Implementing Entity will refuse to sell, or that negotiations to sell will fail. It is impossible to predict at this time where this may occur and in what context it will occur (e.g., how much of the Reserve System has been acquired, the extent of resources remaining to protect). This situation, if it occurs, is only expected near the end of Year 45, when all land acquisition requirements must be met. By this time, most or all of the development impacts will likely have occurred; consequently, any delays in land acquisition associated with a lack of willing sellers will affect few covered activities. This situation can be avoided if the Implementing Entity begins negotiations with key landowners early in the permit term. A review of progress

toward land acquisition goals will take place at least annually with each annual report submitted to the Wildlife Agencies.

If key landowners are not willing to sell, the Implementing Entity, in coordination with the Wildlife Agencies, will reconfigure the land acquisition strategy to ensure that the biological goals and objectives will be achieved and that the total extent and type of lands to be preserved under the Habitat Plan will be acquired. If such a reconfiguration is not possible, the options below will be considered.

- Requiring project proponents to provide land instead of fees to obtain coverage under the Plan (see Section 8.6.7 *Land Dedication In Lieu of Development Fee*).
- Slowing or stopping local permit issuance under the Habitat Plan until key land acquisitions can be made.

8.6.6 Gifts of Land

The Implementing Entity may accept land (or other conservation actions) as a gift or charitable donation. The Implementing Entity will evaluate the conservation benefit of the lands donated relative to the goals, objectives, and requirements of the Habitat Plan. Donated land that does not meet these goals, objectives, and requirements may be sold or exchanged to enable acquisition of land that does meet these goals, objectives, and requirements.

8.6.7 Land Dedication In Lieu of Development Fee

Private landowners or Permittees (i.e., project proponents) may own land that can help to meet the conservation goals of the Plan. Project proponents that own land within a priority conservation area (**Figure 5-8**) may wish to transfer fee title or place a conservation easement on the portion of their property within the Plan's conservation areas. If approved by the Implementing Entity and Wildlife Agencies, this transfer or easement dedication can reduce or eliminate the land cover, serpentine, burrowing owl, and/or temporary impact fees required for development of the remaining portion of the property. Some project proponents who wish to develop parcels may own other parcels within an area targeted for conservation by the Plan. Transferring title or dedicating a conservation easement on the site within the target conservation area could eliminate or substantially reduce some of the development fees to develop the other property. Alternatively, project proponents may prefer to acquire their own mitigation lands within target conservation areas and transfer title of these lands or dedicate easements on them to the Implementing Entity instead of paying all or a portion of the development fees. This section describes the process for allowing these situations.

Land cannot be provided in lieu of any required wetland fees. However, project proponents may implement their own wetland restoration or creation project in

lieu of all or a part of wetland fees. See Chapter 9, Section 9.4.1, subheading *Aquatic Restoration or Creation Provided in Lieu of Wetland Fee* for details.

Criteria for Providing Land In Lieu of Development Fees

Land will be eligible for land cover, serpentine, burrowing owl, and/or temporary impact fee credit if the land satisfies the criteria below.

- The land satisfies the criteria for Reserve System lands in Chapter 5 and as summarized in Section 8.6 above.
- The land is within an area designated as high or moderate priority for acquisition (see Chapter 5, Section 5.3.1 *Land Acquisition and Restoration Actions* and **Figure 5-8**), or the unique and high values on the site justify its inclusion in these designated areas.
- The transaction is approved for the Reserve System by the Implementing Entity and the Wildlife Agencies, consistent with their review and approval authority over all land acquisitions for the Reserve System (see Section 8.6 *Land Acquisition*, Step 9).

Project proponents are encouraged to provide to the Implementing Entity baseline data on their offered properties that document their biological value to the Plan. Documentation should explain how the site meets land acquisition requirements and biological goals and objectives. However, the property owner must provide access to the proposed site to allow Implementing Entity staff or their designees to survey the site and verify its biological value for the Reserve System. If needed, surveys would be performed at no cost to the project proponent. The Implementing Entity should also consult local land managers when evaluating land in lieu proposals to help determine long-term management and monitoring issues, feasibility, and costs. The project proponent will pay the cost of other due diligence such as Phase 1 site assessment, appraisal, and title search.

The Implementing Entity will consider requests for a development fee reduction or waiver in exchange for land dedication (title transfer or conservation easement) on a case-by-case basis. The amount of the development fee reduction will be assessed according to the criteria provided in Chapter 9, Section 9.4.1, subheading *Criteria for Determining Fee Credit for Land Provided in Lieu of Development Fees*.

Stream Setbacks

As described in Chapter 6, Section 6.5, subheading *Condition 11 Stream and Riparian Setbacks*, covered projects that occur adjacent to streams and riparian areas are required to establish setbacks from these resources. Landowners will not pay fees on the portion of their parcels that are dedicated as stream setbacks

(see Chapter 9 for details on required fees or fees waivers). In some cases, stream setback dedications may be suitable for inclusion in the Reserve System and therefore may be able to offset all or a portion of the development fee outside of the setback. To qualify for inclusion in the Reserve System, stream setbacks must be placed in a conservation easement according to the requirements in Section 8.6.3 *Conservation Easements* above. In addition, lands must meet the criteria described above for land in lieu of development fees.

8.6.8 Williamson Act Parcels

The California Land Conservation Act of 1965, or Williamson Act, established the state's primary program for the retention of private land in agriculture and open space use. The Williamson Act is a voluntary program that offers reduced property taxes on lands that have enforceable restrictions on their use via contracts between individual landowners and local governments. Each of the participating jurisdictions administers the Williamson Act program in their jurisdiction. According to data from Santa Clara County, 219,757 acres within the study area are currently under Williamson Act contracts. Williamson Act lands in unincorporated portions of the study area are found in the Santa Cruz Mountains, Diablo Range, and in the Santa Clara Valley floor in and near Morgan Hill and Gilroy.

A majority of the land anticipated to be part of the Reserve System is currently subject to Williamson Act contracts. The preservation of open space is consistent with Williamson Act contracts. However, the intention of these contracts is to preserve agriculture (livestock grazing or cultivated crops) on private lands. If the Implementing Entity acquires lands subject to Williamson Act contracts, the Implementing Entity is expected to allow these contracts to lapse at the end of their 10-year term (i.e., file for non-renewal). Alternatively, the Implementing Entity could apply to the County to convert the contracts to Open Space Easement Agreements pursuant to California Government Code 51255 through an existing County program. Such conversions would be subject to approval by the County Board of Supervisors.

8.7 Roles and Responsibilities in Reviewing Applications for Take Authorization

8.7.1 Permittee Responsibilities

Upon approval of the Plan by the Wildlife Agencies, the Permittees will be issued permits for take of covered species. For projects conducted by a Permittee, the Permittee will be responsible for assuring that the project conforms to the requirements of the Plan, following the process for utilizing take authorization described in Chapter 6, Section 6.7.1 *Evaluation Process for Permittee Projects*.

The Permittees will also be capable of extending Plan coverage to private landowners and other private project proponents within the permit area who are under their jurisdiction, provided that their projects or activities are covered by the Plan and are executed in accordance with the terms and conditions of the Habitat Plan, the permits, and the Implementing Agreement. Landowners and other project proponents who receive this coverage are referred to as *Third Party Participants*.

To receive take authorization under the state and federal permits, private project proponents must apply to their local jurisdiction (i.e., the appropriate city or the County, the local land use planning agency with land use authority for the project) for take authorization following the process described in Chapter 6, Section 6.7.2 *Application Process for Private Projects*.

The participating cities and the County will be the agencies with primary authority and responsibility for reviewing private development applications and authorizing take. Unless another entity is specifically identified in the Plan as responsible for a particular aspect of reviewing private development applications and authorizing take, the responsibility and authority will rest with the cities and the County. Each Permittee will hold all responsibility and authority for their own projects but will have to report their amount of take to the Implementing Entity for tracking purposes.

For project proponents within the permit area that are not subject to the land use authority of a Permittee (i.e., special districts), the project proponent must apply to the Implementing Entity as a Participating Special Entity (see Section 8.4 *Participating Special Entities*).

8.7.2 Implementing Entity Responsibilities

The Implementing Entity will have limited responsibility and authority in reviewing and approving take authorization. Its primary role will be to track the amount and type of take authorization, and to support the Permittee's decision-making process rather than to serve as a final authority to the Permittees. Accordingly, the Implementing Entity will provide tools for Permittees to use in their application review and project assessment process (e.g., checklists, template planning survey report, fee calculator). The Implementing Entity must track impacts of all covered activities in a way that detects when any impact cap is being approached. The Implementing Entity will notify the Permittees when any impact cap is imminent and what procedures should be followed to ensure that the cap is not exceeded. In addition, the Implementing Entity will provide advice, upon request, to the cities and the County as they process applications for take permits and will promote coordination among Permittees to ensure that the Plan is implemented consistently and effectively.

The Implementing Entity has specific authority related to reviewing and approving take authorization, as listed below.

- Reviewing applications from Participating Special Entities (Section 8.4 *Participating Special Entities*) and authorizing take as appropriate.
- Approving offers of land in lieu of fees (Section 8.6.7 *Land Dedication In Lieu of Development Fee*) and of restoration or creation of wetlands in lieu of wetland mitigation fees (see Chapter 9, Section 9.4.1 *Habitat Plan Fees* subheading *Wetland Mitigation Fee*). Local jurisdictions must forward such applications to the Implementing Entity for review, approval, and calculation on a case-by-case basis of the required fees, if any. Once the proposal is approved, the terms of the land offer, habitat restoration/creation, and any remaining fees will be forwarded to the local jurisdiction for their incorporation into the project conditions of approval.
- Reviewing and approving stream-setback exceptions requested by a local jurisdiction, and reviewing and commenting on, if necessary, stream-setback exceptions requested by a private applicant (see Chapter 6, Section 6.5, subheading *Condition 11 Stream and Riparian Setbacks*).
- Recalculating the fees annually according to the indices described in Chapter 9, Section 9.4.1 *Habitat Plan Fees* subheading *Adjustment of Mitigation Fees* or periodically according to the assessment process described in the same section, and providing the new fees to the Permittees. The Implementing Entity will notify each Permittee of the new fees.
- Approving the design requirements for rural road projects as they relate to the covered species and are consistent with the conditions described in Chapter 6, Section 6.4.4, subheading *Condition 6 Design and Construction Requirements for Covered Transportation Projects.*

8.7.3 Wildlife Agency Responsibilities

The Wildlife Agencies will not be involved in approving take authorization for Permittees or for private development projects within the jurisdiction of the Permittees on a project-by-project basis, except in limited circumstances (e.g., where Section 7 consultations are still required [see the Section 7 process in Chapter 1 and Section 7 Assurances in Chapter 10]) or as required by this Plan (see following section). The Wildlife Agencies will also have approval authority over inclusion of Participating Special Entities (Section 8.4 *Participating Special Entities*). The Wildlife Agencies may monitor the Permittees as they grant take to individual projects. The Permittees are not required to transmit copies of application materials to the Wildlife Agencies each time an application is approved. Permittees are required, however, to provide such information to the Wildlife Agencies upon request. The Wildlife Agencies may offer comments to Permittees, but the granting of take authorization to individual covered activities will remain the purview of the Permittees. The purpose of Wildlife Agency monitoring issuance of take authorization to covered activities is to facilitate communication so that errors or differences of opinion can be addressed before they become serious problems.

The Wildlife Agencies' main responsibility however, will be ensuring that the Permittees are in compliance with the state and federal permits, Implementing Agreement, and Plan. Reviewing and commenting on annual reports and monitoring reports (see Section 8.10 *Data Tracking*) will be a key means for the Wildlife Agencies to monitor compliance. The Wildlife Agencies will also review and approve all:

- Reserve unit management plans,
- Site restoration plans,
- Plant and pond creation proposals[15],
- Covered species translocation activities,
- Tier 3 burrowing owl conservation actions,
- Burrowing owl management agreements,
- Burrowing owl passive relocation,
- Conservation easements, and
- Land acquisition proposals.

Additional Review

A small subset of the covered activities will require additional review and approval by the Wildlife Agencies to ensure that the covered activity is adequately defined, consistent with the Habitat Plan, and incorporates appropriate conditions in Chapter 6. Early consultation with the Wildlife Agencies is strongly encouraged to ensure that relevant conditions of the Plan are incorporated into project designs and proper surveys are conducted in advance of project construction. These projects and the allowable scope of Wildlife Agency review are described below (see Chapter 2 for details on these activities).

- Highway, roadway, interchange upgrades, and mass transit projects occurring outside the planning limit of urban growth or in any in-stream area. The scope of the early design coordination will be limited to ensuring the relevant conditions of the Plan are incorporated into project design.
- Flood protection projects proposed by SCVWD that are covered by this Plan. The scope of this review will be limited to early conceptual design and to ensuring that impacts described in Chapter 4 are not exceeded and that the conditions in Chapter 6 are being applied properly to minimize effects on covered species.
- Levee reconstruction projects that go beyond the current footprint of the levee and results in permanent impacts to the stream.

[15] If the Implementing Entity establishes a Habitat Plan RGP or other approved permitting process with the Regional Boards, the Corps and Regional Boards would also have review authority over restoration and creation projects that are intended to meet the mitigation requirements of those agencies.

- Supplemental water pipeline alignment associated with dam seismic retrofit projects that occurs in natural land cover types.
- Borrow sites for dam seismic retrofit projects will also be subject to additional Wildlife Agency review due to the uncertain location and size of these projects. The scope of the Wildlife Agency review of proposed borrow sites will be limited to location, size, and impacts of the borrow sites to covered species and their habitat.
- Alamitos Creek/Almaden Reservoir fish passage. The scope of the Wildlife Agency review will be limited to the effects of the selected fish passage alternative on the covered species.
- Dewatering events at reservoirs where flows will be released to local channels. This includes review and approval of a reservoir-specific dewatering plan, which will be developed prior to the first dewatering event at each covered reservoir.
- Reoperation of the Ford Road or Church Avenue groundwater recharge ponds, if SCVWD identifies a potential change in downstream flows at either facility that may affect covered species beyond that identified in Chapter 4 (no changes in downstream flows are expected at either site).
- Activities that are major new point sources of nitrogen deposition that could adversely affect serpentine natural communities and associated covered species (e.g., new power plant, large diesel generators, or other facilities). The Wildlife Agencies will determine if the effects analyzed in the Habitat Plan adequately address the effects of new major sources of nitrogen. If the effects were not adequately analyzed, a major amendment, as described in Chapter 10, may be appropriate.

8.8 Three Creeks HCP

As described in Chapters 2 and 5, the SCVWD is preparing a separate HCP for its water supply operations in the three watersheds that drain to the San Francisco Bay—the Coyote Creek, Guadalupe River and Stevens Creek watersheds (proposed Three Creeks HCP). The proposed Three Creeks HCP includes implementation of the Fisheries and Aquatic Habitat Collaborative Effort (FAHCE). Many of the covered activities and conservation actions proposed in the Three Creeks HCP in the Coyote Creek and Guadalupe River watersheds are also included in this Plan. Both plans are consistent with each other for these overlapping covered activities and conservation actions.

The permits for the two plans will not overlap. SCVWD will request a permit from NMFS for the proposed Three Creeks HCP but not the Habitat Plan. SCVWD will request incidental take authorization for impacts not addressed in this Habitat Plan from USFWS for covered species affected by Three Creeks HCP covered activities through either Section 7 or Section 10 of the ESA, as appropriate. For example, the Habitat Plan does not cover the upper Guadalupe River Watershed above Vasona Lake (e.g., Lexington Reservoir is not covered by the Habitat Plan) but this area is covered by the Three Creeks HCP.

Similarly, the Habitat Plan excludes a small portion of the lower Coyote Creek Watershed in the City of Milpitas that is covered by the Three Creeks HCP (see **Figure 1-3**).

We expect consistent and cooperative implementation of the two plans because, where there is geographic and functional overlap of the two conservation plans, (a) the two plans provide for conservation goals, objectives, and actions that are consistent with each other, and (b) any proposed Three Creeks HCP conservation measures implemented prior to approval of the Habitat Plan will be consistent with the measures provided for in the Habitat Plan. For example, the Habitat Plan identifies areas where suitable habitat exists and may be acquired, protected, and managed to contribute to the recovery of listed species. SCVWD will provide mitigation for terrestrial species and habitats consistent with what has been proposed by the Habitat Plan—e.g., within the areas identified to be acquired and using the same criteria to guide acquisition, protection, management, and monitoring by the Habitat Plan.

8.8.1 Implementation Structure

As the sole permittee for the proposed Three Creeks HCP, the SCVWD is solely responsible for administering and implementing that plan and for compliance with the terms and conditions of its Implementation Agreement and permits, as well as all other applicable laws. USFWS, NMFS, CDFG, the draft settlement agreement parties, and the public will also participate in some way in the Three Creeks HCP implementation. The successful execution of the Three Creeks HCP conservation strategy, monitoring and adaptive management program, and reporting that are part of the Three Creeks HCP require coordinated actions between and among the SCVWD, the Wildlife Agencies, and in some cases, other parties.

8.8.2 Adaptive Management

SCVWD will be responsible for, and oversee, the monitoring and adaptive management program for the proposed Three Creeks HCP, which has been designed to be consistent with the monitoring and adaptive management program of this Plan (Chapter 7). The SCVWD will perform day-to-day activities, including prioritizing management actions, disseminating information, developing annual and long-term work plans, and formulating adaptive management strategies. SCVWD may implement additional and/or modified biological monitoring, studies, or management measures consistent with the Three Creeks HCP.

The Wildlife Agencies, among others, will provide input and help guide the proposed Three Creeks HCP's adaptive management program, but the SCVWD has ultimate responsibility for implementing the program and instituting changes through adaptive management.

8.9 Implementing Agreement

The NCCP Act requires an Implementing Agreement for all NCCPs, and specifies necessary provisions. Although not a requirement under ESA, Implementing Agreements are recommended by USFWS for large-scale HCPs that address significant portions of a species range, for HCPs with long-term mitigation and monitoring programs, or for HCPs that include complicated conservation programs.

The purpose of an Implementing Agreement is to ensure that each party understands its obligations under the HCP Section 10(a)(1)(B) permits and NCCP permit, and to provide remedies should any party fail to fulfill its obligations. Accordingly, an Implementing Agreement has been prepared for this Plan (**Appendix B**). This agreement specifies the responsibilities of each party; how minimization, mitigation, and conservation measures will be implemented; reporting and enforcement procedures; and various other provisions agreed to by the parties. The Implementing Agreement references material in the Habitat Plan whenever possible. As a result, the Habitat Plan and the Implementing Agreement have been made as consistent as possible. In the unlikely event that there are inconsistencies among documents, the permits prevail first, then the Implementing Agreement, and finally the Habitat Plan.

8.10 Data Tracking

8.10.1 Database Development and Maintenance

The Implementing Entity will develop and maintain a comprehensive data repository (i.e., database) to track permit compliance and all other aspects of the Habitat Plan including land and stream management and monitoring. The data repository to track permit compliance will be operating within 12 months after all local ordinances take effect. The data repository will be structured to be "user friendly," such that a trained staffer (as opposed to a technician or programmer) can enter data. Additionally, the data repository will allow for future expansion and integration with an external database (e.g., linkage to agency or other GIS map libraries). The data repository will be structured to facilitate the following requirements.

- Data documentation such that future users can determine why, how, and where data were collected (documentation standards [i.e., data about the data] should be consistent for all types of monitoring and over time; adequate documentation will facilitate the future use of monitoring data).
- Quality assurance and quality control of the data.
- Access and use of the most current information in assessment and decision making (the database will allow repeated access to current and past information over time).
- Storage of spatial information in a GIS-linked or similar database.

- Data queries and reports.

The primary types of information for which the data repository will be developed and maintained are listed below.

- Status of covered activities, including implementation and impacts on covered species and natural communities.
- Status of Habitat Plan natural community preservation/enhancement/ creation/restoration conservation measures.
- Habitat Plan funding and expenditures.
- Monitoring and directed study results.
- Adopted changes to the Habitat Plan, including administrative changes, minor amendments, or major amendments (all defined in Chapter 10).
- All reports and documents generated by the Implementing Entity or the Permittees related to the Habitat Plan.

When the database is first operational after the first year of implementation, it will support as many of the components listed above as will be needed to report on Plan compliance. For example, funding and expenditures will begin in the first year but the results of directed studies will not be available for several more years.

The Implementing Entity may choose to develop a web-linked database to facilitate members of the public and Permittee staff obtaining site-specific information and controlled transfer of information by others into and out of the database. Examples of benefits that could be associated with maintaining controlled web-linked access to selected elements of the comprehensive Habitat Plan database are provided below.

- Development of database entry forms or use of handheld devices that could allow direct input of information into the database by those charged with implementing covered activities, conservation measures, monitoring surveys, and directed studies.
- Access by agencies implementing the Habitat Plan to digital monitoring, research, and other data for purposes of generating internal reports that may be needed to facilitate their participation in the Habitat Plan.
- Access by agencies implementing the Habitat Plan, other ecosystem restoration programs, outside researchers, and other interested parties to Habitat Plan reports and documents.

The Implementing Entity will comply with the data sharing requirements of the Implementing Agreement. If the Implementing Entity allows additional access to the project databases, such access will require strict controls and monitoring to ensure that the integrity of the database is maintained (e.g., use of passwords to limit access of a particular entity to selected database functions, sampling data entry forms to ensure that entered information is complete, compatible, and accurate).

8.10.2 Compliance Tracking

The Implementing Entity will track all aspects of compliance with the permits, Implementing Agreement, and Habitat Plan. To track compliance, the Implementing Entity will maintain data as specified below.

- The amount of land cover (**Tables 4-2 and 4-3**), modeled habitat for covered species (**Table 4-4**), and critical habitat (**Table 4-9)** temporarily and permanently impacted by covered activities will be tracked by the Implementing Entity regularly, but no less than annually by overlaying impacts that year (and cumulatively) with each species model in a GIS exercise to ensure that impact caps are not exceeded. Modeled habitat impacts (**Table 4-4**) and modeled habitat acquisition requirements (**Table 5-17**) will be tracked according to the most recently developed land cover maps and habitat models. Implementation of species surveys described in Chapter 6 and the remaining Conservation Strategy (Chapter 5) will be directed by the most current land cover maps and habitat models updated and maintained by the Implementing Entity throughout the permit term.
- The location, extent, and timing of land acquisition and Habitat Plan reserve establishment within each Conservation Analysis Zone according to the requirements in Chapter 5 and in **Tables 5-11, 5-13, 5-16, 5-17, and 5-18**.
- Tracking implementation of management agreements for western burrowing owl nesting habitat (number of acres under management).
- The status of implementation of each conservation action listed in **Tables 5-2a and 5-2b**.
- The success of the conservations actions in meeting the biological objectives in Chapter 5 and in **Tables 5-1a through 5-1d**.
- Descriptions of recorded conservation easements, management agreements for western burrowing owl nesting habitat, lands acquired in fee title, interagency memorandums of agreement, or any other agreements entered into for the purposes of protecting, enhancing, restoring, or creating covered species habitat.
- The location, extent, and timing of impacts on land cover types (including direct and indirect impacts to wetlands) and plant occurrences, by year and cumulative total[16], based on reports submitted by project proponents and Permittees for take authority under the Habitat Plan.
- The location and extent of annual and cumulative compliance with the species occupancy requirements.
- The location, extent, and timing of restoration or creation of applicable land cover types (**Table 5-12**).
- The location, extent, timing, and progress of plant occurrence creation and enhancement (**Table 5-16**).

[16] Although the tables in Chapter 4 describe impact limits by Permittee, this was done for estimation purposes only. During Plan implementation, take and compliance tracking will be measured against total impact limits for the Permittees collectively.

- The location, extent, timing, and success rates of implementation of all other conservation actions described in Chapter 5 (e.g., preparation of reserve unit management plans, including recreation plans, construction of artificial perches, conducting monitoring).

The Wildlife Agencies may also request other information from the Implementing Entity to verify compliance with the Plan and the Wildlife Agencies' decision documents (e.g., CEQA and NEPA mitigation measures, impacts to critical habitat units). The purpose of monitoring this information will be to track the Implementing Entity's progress toward successful implementation of the conservation strategy described in Chapter 5 of this Plan. This tracking of progress will help ensure that habitats for covered species and natural communities are conserved within the Reserve System at a rate commensurate with the timing and magnitude of impacts from covered activities. The data repository for permit compliance tracking will be operating within 12 months after all local ordinances take effect.

The data will also be linked to supporting information documenting Habitat Plan compliance. These reports and other data will be stored and archived electronically whenever possible. Appropriate supporting information includes the following categories.

- Application material submitted for covered activities.
- Preconstruction survey reports.
- Reports and other documentation related to the screening, selection, and acquisition of reserve lands.
- Designs for covered activities that demonstrate compliance with relevant conditions in Chapter 6 (e.g., urban-wildland interface design elements).

HabiTrak is a standardized database developed by CDFG and others to track NCCP implementation. The database developed for the Plan must be compatible with the HabiTrak system or its successor so that compliance tracking for this Plan can be compared with other NCCPs in California.

Compliance tracking will be supported by the monitoring and adaptive management program described in Chapter 7. In addition to compliance tracking, the monitoring program includes effectiveness monitoring, status and trends monitoring, and directed studies aimed at addressing key management or ecological questions. The data tracking system will be developed to assemble, store, and analyze all monitoring data in the program. The details of the monitoring program will not be developed until individual reserve unit management plans are prepared for each reserve (**Table 8-1**). By necessity, therefore, the data tracking system for the monitoring and adaptive management program cannot be finalized until after this Plan is completed.

8.11 Reporting

The Implementing Entity will prepare annual reports over the term of the Habitat Plan that document permit compliance (see Section 8.10.2 *Compliance Tracking*), impacts, conservation actions, management actions, restoration/creation actions, and monitoring results. The annual reports will summarize the previous fiscal year's implementation activities (July 1 to June 30) and be completed by March 15 following the reporting fiscal year. No annual report will be required for the first partial fiscal year. Annual reports will require synthesis of data and reporting on important trends such as land acquisition, fee collection, and habitat restoration. A due date of March 15 will allow time for the data from the previous fiscal year to be assembled, analyzed, and presented in a clear and concise format.

Annual reports will be submitted to the Implementation Board for review and approval. Annual reports will also be submitted to designated representatives of the Wildlife Agencies, and other interested parties such as the Corps and Regional Boards, and will be available to the public and posted on the Habitat Plan website. The Implementing Entity will also distribute these reports to the Independent Conservation Assessment Team and science advisors, as appropriate, for their review. These advisory bodies will use results presented in the annual reports, as well as other available information and any additional monitoring reports produced through the Adaptive Management Program, to assess success of the Habitat Plan in meeting the biological goals and objectives and to formulate recommendations to the Implementing Entity for Plan implementation in subsequent years.

The goals of the annual report are listed below.

- Providing the information and data necessary for the Permittees to demonstrate to the Wildlife Agencies and the public that the Plan is being implemented properly and as anticipated.
- Disclosing any problems with Plan implementation so they can be corrected.
- Documenting issues with Plan implementation that may require consultation with the Wildlife Agencies.
- Identifying administrative or minor changes to Plan components required to increase the success of conservation measures.

At a minimum, annual reports will include the following information.

- A description of all covered activities implemented during the reporting period categorized by major activity type (per Chapter 2) and acreage.
- A year-to-date and cumulative summary (i.e., from the start of the permit term) of permanent and temporary impacts on all land cover types. Impacts on riparian and wetland land cover types will also be reported by watersheds.

- A year-to-date and cumulative summary of impacts to modeled habitat of covered species[17] and to covered plant occurrences.
- A year-to-date and cumulative summary of the total impacts to critical habitat of the California red-legged frog, California tiger salamander, and Bay checkerspot butterfly.

- A year-to-date and cumulative summary of impacts associated with projects exempt from fees and/or conditions of this Plan.
- An accounting of all conditions on covered activities applied to these activities (see Chapter 6).
- A list of all riparian setback exceptions granted each calendar year (Chapter 6).
- A description of all natural community protection/enhancement/ creation/restoration conservation actions implemented during the reporting period. Riparian and wetland restoration and creation will also be reported by the watersheds shown in **Figure 3-6** to facilitate regional coordination of wetland mitigation for the Corps and the Regional Boards.
- A year-to-date and cumulative summary of stream and riparian restoration conducted outside of the Reserve System.
- A year-to-date and cumulative summary of the extent of land cover types protected, enhanced, restored, or created. The success rate for restoration and creation projects will also be documented. If conservation easements were used, the report will describe who holds the easements. A map containing this information will also be provided.
- A year-to-date and cumulative summary of the extent of modeled habitat for covered species protected. This will be calculated by overlaying the most current species habitat models.
- A copy of all easements recorded during the reporting year.
- A year-to-date and cumulative summary of the protection of occupied habitat for select covered wildlife species described in Chapter 5.
- A year-to-date and cumulative summary of the protection or creation of covered plant occurrences and occupied habitat for selected covered wildlife species as defined in Chapter 5.
- A year-to-date and cumulative summary of permanent and temporary management agreements for the burrowing owl to demonstrate that the amount of managed lands for the burrowing owl at no time decreases during the permit term, as described in Chapter 5.
- A year-to-date and cumulative summary of exceptions to the burrowing owl passive relocation prohibition, as described in Chapter 6.
- An assessment of the progress toward all acquisition requirements by local, state, and federal sources, including land cover types, landscape linkages,

[17] Species habitat models will be updated during the permit term based on best available science. This data will be used for tracking compliance for impacts and conservation.

covered plant occurrences, and wetland protection. This assessment will include evaluation of compliance with the reserve design and assembly principles in Chapter 5 (e.g., minimizing edge).

- An assessment of compliance with the Stay-Ahead provision (Section 8.6.1 *Stay-Ahead Provision*) and a forecast of expected take and land acquisition needs for the next 2 years.
- An accounting of all revenues received, by type (e.g., development fees, wetland fees, grants) and an assessment of progress towards total revenue goals. Funding from local, state, and federal sources must be tracked separately. Any fee adjustments must also be reported.
- An evaluation of the economic assumptions on which the Plan was based (e.g., Plan costs, revenue rates and grant funding projections).
- An assessment of progress toward a complete funding strategy for implementation after the permit term (Chapter 9, Section 9.4.2, subheading *Interest Income*).
- A summary of all land and water management activities undertaken on and off the reserves and a discussion of the management issues facing the Implementing Entity.
- A presentation of the conceptual ecological models developed to date and any changes to them that have taken place.
- A description of the landscape-, natural community-, and species-level monitoring undertaken during the reporting period and a summary of monitoring results, including species status and trends.
- A description of the adaptive management process utilized during the reporting period (e.g., consultation with science advisors, convening of the Independent Conservation Assessment Team).
- A summary of the recommendations or advice provided by the Wildlife Agencies, science advisors, and the Independent Conservation Assessment Team (if applicable) regarding adaptive management and monitoring.
- A summary of the monitoring program objectives, techniques, and protocols including monitoring locations, variables measured, sampling frequency, timing, and duration, analysis methods, and who performed the analyses.
- An assessment of the efficacy of the monitoring and research program and recommended changes to the program based on interpretation of monitoring results and research findings.
- An assessment of the efficacy of habitat restoration and creation methods in achieving performance objectives and recommended changes to improve the efficacy of the methods.
- A description of all Habitat Plan directed studies undertaken during the reporting period; a summary of study results; and a description of integration with monitoring, assessment, and compliance elements.
- An assessment of the appropriateness of performance indicators and objectives (see **Table 7-1** for examples) based on the results of effectiveness

monitoring, and recommended changes to performance indicators and objectives.

- An assessment of changes in temperature in the study area (see Chapter 10, Section 10.2.1 *Changed and Unforeseen Circumstances*).
- A description of any actions taken or expected regarding changed circumstances, including remedial actions.
- A description of any unforeseen circumstances that arose and responses taken.
- A year-to-date and cumulative summary of Certificates of Inclusion issued for Neighboring landowner agreements, including the size and location of lands covered by them.

- A summary of any administrative changes, minor modifications (e.g., updates to **Figure 2-5**), or major amendments proposed or approved during the reporting year (see Chapter 10, Section 10.3 *Modifications to the Plan*).

Federal guidelines for the contents of monitoring reports also recommend inclusion of biological goals and objectives in these reports. However, **Tables 5-1a–d and 5-2a–b** serve this purpose. Therefore, biological goals and objectives do not need to be reported annually (progress towards meeting the goals and objectives will be reported, however).

Electronic copies of the following data will be provided upon request to the Wildlife Agencies and to the public[18].

- Copies of all non-confidential, non-proprietary portions of the database that track covered activities and land acquisition in the possession and control of the Implementing Entity in its current state.
- Copies of all relevant GIS data in possession and control of the Implementing Entity in its current state, including land cover, the location of covered activities, and the boundaries of the current Habitat Plan Reserve System.
- Copies of all non-confidential, non-proprietary financial data in possession and control of the Implementing Entity in its current state.

8.12 Schedule and Deadlines

To ensure a successful Plan, the Implementing Entity will make progress on a variety of tasks simultaneously. Tasks during the first several years of implementation will be particularly important to ensure positive momentum and early compliance with Plan terms and conditions. Schedule guidelines and major deadlines for Plan implementation are presented in **Table 8-1**. Tasks are divided

[18] Data provided to the public will be subject to any restrictions on proprietary or confidential data or services that may be utilized by the Implementing Entity such as proprietary aerial photos, parcel databases, confidential species locations, or pending land transactions.

among the Permittees, Cities and County, and the Implementing Entity. The Implementing Agreement will establish deadlines for certain tasks.

Table 8-2 lists those key implementation tasks with deadlines that are tied to permit compliance. As described in the table, these deadlines have various levels of flexibility depending on the circumstances. Implementation deadlines are important to establish a mutual understanding among the Permittees and the Wildlife Agencies about how the Plan will be implemented over time and to ensure that the Plan will be implemented in a timely manner. However, the Permittees and the Wildlife Agencies recognize that under certain circumstances, modifications to the deadlines beyond the flexibility provided in **Table 8-2** could be reasonable and appropriate. The Implementing Entity may modify, with the approval of the Wildlife Agencies, the deadlines through minor modifications or major amendments to the Plan, as described in Chapter 10, Section 10.3 *Modifications to the Plan*.

Before permits are issued, the Local Partners will set the groundwork for Plan implementation by establishing the implementation organization. Grant writing, land acquisition, and training of local jurisdiction staff may also commence before permit issuance. During the first 6 months of the permit term, emphasis will be placed on hiring key administrative staff for the Implementing Entity (or contracting out their functions), establishing the Public Advisory Committee, establishing local ordinances required to fund and implement the Plan, and developing implementation tools. At initiation of the permit term, tasks of grant writing, land acquisition, and Plan implementation training will transfer from the Permittees to the Implementing Entity or its agent (e.g., a local land management agency). During the permit term, the Implementing Entity will be responsible for these tasks. Both the local jurisdictions and the Implementing Entity will be responsible for collecting development fees throughout the permit term. Within the first year, the Implementation Entity will secure necessary staff and contract resources, identify scientific advisors, create a Plan implementation web site, establish the required database, and investigate wetland restoration opportunities.

Over the next 5 years, additional Reserve staff will be hired or contracted, and more specific reserve unit management plans will be created and initiated to manage and monitor the expanding Reserve System. Environmental compliance and design for wetland restoration and creation will be initiated. The Implementing Entity will also begin to develop strategies for post-permit funding for monitoring and management. Beginning with this period and extending throughout the remaining permit term, fees will be updated and adjusted on a regular basis, and conservation assessments will be conducted. In addition, the hiring and contracting of staff will be completed to manage the Reserve System and implement the Plan. Habitat restoration and design will continue, as will the adaptive management and monitoring of biological resources.

Between Years 6 and 50, the Implementing Entity will continue to implement the conservation strategy, implement monitoring and adaptive management, and refine these programs as monitoring and other data are collected. Land acquisition that will require restoration or creation must be completed by Year 40. All other land acquisition must be completed by Year 45, and

construction of all restoration and creation projects must be completed by Year 40 of the permit term. (See Chapter 9 for a discussion of funding adequacy to meet these deadlines.)

Before the end of the permit term, the Implementing Entity will also determine the administrative structure necessary to continue management on the Reserve System in perpetuity. For example, management responsibility may be delegated to one of the Permittees to continue to oversee in perpetuity. Alternatively, the Joint Powers Authority may extend its term to continue to oversee implementation of the Habitat Plan.

Table 8-1. Schedule for Major Implementation Tasks

Time Period	Tasks and Milestones (**Key Task Tied to Permit Compliance; see **Table 8-2**) [If applicable, Habitat Plan reference included]	Responsible Party[1]
Prior to Permit Issuance (i.e., Year 0)		
	Complete final versions of Implementing Agreement, Joint Exercise of Powers Agreement, and Permittee ordinances in preparation for permit issuance and Implementing Entity formation. [Chapter 8, Section 8.5]	Local Partners
	**Establish Implementing Entity through execution of the Joint Exercise of Powers Agreement. File with State Secretary of State within 30 days of its effective date. [Chapter 8, Section 8.2.2]	Local Partners
	**In accordance with the Implementing Agreement and Joint Exercise of Powers Agreement, establish Habitat Plan implementation organizational structure (i.e., Implementing Entity's Governing Board and Implementation Board). [Chapter 8, Section 8.2]	Local Partners
	Where feasible, apply for state/federal grants for land acquisition (after publication of Draft Habitat Plan). [Chapter 8, Section 8.3.5; Chapter 9, Section 9.4.3]	Local Partners
	Develop template Habitat Plan application package for use by private applicants and Permittees that includes all items required in Chapter 6, Section 6.8 (Items 1 through 6).	Local Partners
	Develop a checklist prior to the first ordinance taking effect for local planners to evaluate the Habitat Plan application package. This will help ensure compliance by each project receiving coverage under the Plan. The checklist must include a statement of certification that project applicants meet the relevant terms of the Habitat Plan. [Chapter 6, Section 6.7.2]	Local Partners
	Prepare a template form prior to the first ordinance taking effect for local planners to document that a private applicant's project is consistent with the Plan. This consistency determination will be made based on the checklist described above. [Chapter 6, Section 6.7.2]	Local Partners
	Provide each Permittee with Plan maps (e.g., fee zone, land cover, private development coverage, modeled habitat) to allow local agency staff to process and evaluate applications for Habitat Plan coverage or evaluate their own projects under the Plan. [Chapter 2, Chapter 6, Chapter 9]	Local Partners
	Train local jurisdiction staff to review and process Habitat Plan applications. This task will be ongoing.	Local Partners
	Commence the recruitment process for Implementing Entity Administrative Director and key staff (if possible, to allow early implementation). [Chapter 8, Section 8.3.2]	Local Partners
By Permit Issuance (Day 1)		
	Prepare initial budget for Implementing Entity.	Permittees
Post-Permit		
0–6 months	Hire Implementing Entity Administrative Director and key staff (if not completed prior to permit issuance). This task will be ongoing. [Chapter 8, Section 8.2.2]	Implementing Entity

Time Period	Tasks and Milestones (**Key Task Tied to Permit Compliance; see **Table 8-2**) [If applicable, Habitat Plan reference included]	Responsible Party[1]
	Develop a set of biologist qualifications and establish pre-approved list of biologists per Chapter 6, Section 6.8.5. This task will be ongoing.	Implementing Entity
	Develop template pre-acquisition assessment and protocols prior to the first land acquisition. [Chapter 5, Section 5.2.3, subheading *Field Verification Prior to Acquisition*, and Chapter 8, Section 8.6]	Implementing Entity
	Train local jurisdiction staff to prepare, review, and process Habitat Plan applications. This task will be ongoing.	Permittees, with ongoing assistance from Implementing Entity
	Update GIS land cover layer with aerial photographs, satellite imagery, and other relevant data sources including serpentine soils maps at the outset of implementation. [Chapter 7, Section 7.2.2 *Program Phases*, subheading *Inventory Phase*, subheading *Document Baseline Conditions*]	Implementing Entity
	Provide each participating local jurisdiction with detailed maps of fee zones and land cover so they can process and evaluate Habitat Plan applications. [Chapter 9, Section 9.4.1]	Implementing Entity
	Review private development applications for coverage under the Habitat Plan. This task will be ongoing. [Chapter 6, Section 6.7; Chapter 8, Section 8.7]	Cities and County
	Prepare and review applications for public sector activities under the Habitat Plan to be submitted to Implementing Entity. This task will be ongoing. [Chapter 6, Section 6.7; Chapter 8, Section 8.7]	Permittees
	Establish Technical Advisory and Public Advisory committees. [Chapter 8, Sections 8.2.4 and 8.2.7]	Implementing Entity
	Where feasible, apply for state/federal grants for land acquisition. This task will be ongoing. [Chapter 8, Section 8.3.5; Chapter 9, Section 9.4.3]	Implementing Entity, Permittees
	Determine the date by which the annual automatic update of development fees will occur. [Chapter 9, Section 9.4.1 *Habitat Plan Development Fees*, subheading *Automatic Adjustment of Mitigation Fees*]	Implementing Entity
	Collect Habitat Plan fees. This task will be ongoing. [Chapter 9, Section 9.4.1]	Cities and County, Implementing Entity
6 months–1 year	Hire key administrative staff of Implementing Entity or secure agreements or contracts with other organizations to fulfill these roles. [Chapter 8, Section 8.2.2]	Implementing Entity, Permittees
	Establish Habitat Plan Implementation web site. [Chapter 8, Section 8.3.9]	Implementing Entity
	Investigate aquatic enhancement, restoration, and creation opportunities on existing open space and newly acquired land to ensure Stay-Ahead on wetland impacts. This task will be ongoing. [Chapter 8, Section 8.6.1]	Implementing Entity Permittees
	Establish and maintain database to track permit compliance (e.g., land acquisition and Habitat Plan impacts). This task will be ongoing. [Chapter 8, Section 8.10.1]	Implementing Entity, Permittees

Time Period	Tasks and Milestones (**Key Task Tied to Permit Compliance; see **Table 8-2**) [If applicable, Habitat Plan reference included]	Responsible Party[1]
1–5 years	Continue to hire or contract out Implementing Entity technical and operational staff as Reserve System expands. [Chapter 8, Section 8.2.2]	Implementing Entity
	**Update fees annually according to Chapter 9. Provide new fee schedule to Permittees. This task will be ongoing. [Chapter 9, Section 9.4.1]	Implementing Entity, Cities and County
	At intervals specified in Chapter 9, perform financial assessment. This task will be ongoing. [Chapter 9, Section 9.4.1, subheading *Adjustment of Mitigation Fees*]	Implementing Entity
	**Submit annual report to the Wildlife Agencies. This task is performed on an annual basis by March 15 of every year for the previous fiscal year (July 1 to June 30). [Chapter 8, Section 8.11]	Implementing Entity
	Conduct annual meeting to report on implementation progress of Habitat Plan. This task will be ongoing. [Chapter 8, Section 8.2.7]	Implementing Entity
	Prepare reserve unit management plans as described in Chapter 5 for the five expected reserve units. • Upper Penitencia Creek, • Coyote Ridge, • Pacheco Watershed, • Southern Santa Cruz Mountains, and • Santa Teresa Hills. ** Plans must be prepared within 5 years of the first parcel acquired in each reserve unit and updated as needed, but reviewed no less than every 5 years [Chapter 5, Section 5.2.5]	Implementing Entity
	Initiate adaptive management and monitoring of biological resources. This task will be ongoing. [Chapter 7]	Implementing Entity
	Establish pool of science advisors to provide technical advice to Implementing Entity and Permittees on monitoring and adaptive management. This task will be ongoing. [Chapter 7, Section 7.2.3; Chapter 8, Section 8.2.6]	Implementing Entity
	Initiate or continue management and monitoring in Reserve System. [Chapter 5, Section 5.2.5 and Chapter 7, Section 7.1.4]	Implementing Entity t
	**Continue to acquire land to assemble Reserve System and meet Stay-Ahead provision requirements (by Year 2). This task will be ongoing; however, all land acquisition must be completed by Year 45. [Chapter 5, Section 5.3.1; Chapter 8, Section 8.6.1]	Implementing Entity Permittees
	Begin wetland restoration and creation design and additional environmental compliance for restoration and creation. This task will be ongoing. [Chapter 5, Sections 5.3.6 and 5.3.7]	Implementing Entity

Time Period	Tasks and Milestones (**Key Task Tied to Permit Compliance; see **Table 8-2**) [If applicable, Habitat Plan reference included]	Responsible Party[1]
	Implement plant and aquatic land cover restoration and creation projects described in Chapter 5. This task will be ongoing; however, construction of all habitat restoration and creation projects for land-cover types and plant occurrences (Coyote ceanothus, smooth lessingia, and Metcalf Canyon jewelflower) must be completed by Year 40. [Chapter 5, Sections 5.3.1, 5.3.7, 5.4.11, 5.4.16, and 5.4.17; Chapter 8, Sections 8.12 and 8.6.1]	Implementing Entity
	Open selected reserves to public access according to reserve unit management plans. Develop enforcement procedures for the Reserve System before newly acquired land (excluding existing open space added to the Reserve System) is open to public access. [Chapter 6, Section 6.4.6. subheading *Condition 9*; Chapter 8, Section 8.3]	Implementing Entity or applicable local agencies
	Begin implementation of required studies and prioritize implementation of remaining studies described in Chapter 5. [Chapter 7, Sections 7.2.1 and 7.2.2]	Implementing Entity
	Update land cover map with most recent aerial photograph and provide to local jurisdictions implementing the Plan (at least every 5 years). This task will be ongoing. [Chapter 7, Section 7.3.1]	Implementing Entity
	Develop a wildfire local operating agreement for the Reserve System with Cal Fire and with any other firefighting agency that has responsibility for the Reserve system lands within 4 years of permit issuance. [Chapter 5, Section 5.3.2, subheading *Fire Management*]	Implementing Entity
	By the beginning of Year 4, renew the MBTA Special Purpose Permit for least Bell's vireo for another 3-year term. [Chapter 6, Section 6.3]	Implementing Entity
	By Year 5, develop stream management guidelines for private landowners, including an educational program to assist in the implementation of the guidelines (other public education and outreach tasks are also required, but do not have specific deadlines; see text). [Chapter 5, Section 5.3.2, subheading *Public Education and Outreach*; Section 5.3.5, subheading *Private Landowner Education*]	Implementing Entity
	At Year 5 and every 5 years afterwards, establish Independent Conservation Assessment Team and conduct assessment of entire conservation program. [Chapter 7, Section 7.2.3; Chapter 8, Section 8.2.6]	Implementing Entity
6–50 years	**Determine the target population size of Mount Hamilton thistle, fragrant fritillary, and Loma Prieta hoita by Year 10. [Chapter 5, Sections 5.4.12, 5.4.14, and 5.4.15]	Implementing Entity
	Initiate feasibility study when adequate monitoring data exist on wildlife movement in three focal areas described in Chapter 5, Section 5.3.2 or by year 10 of implementation, whichever comes first. [Chapter 5, Section 5.3.2]	Implementing Entity
	In year 20 of implementation, work with the Wildlife Agencies to conduct a formal and complete review of progress toward building the Reserve System. [Chapter 7, Section 7.2.3 *Program Implementation*, subheading *Program Infrastructure*]	Implementing Entity

Time Period	Tasks and Milestones (**Key Task Tied to Permit Compliance; see **Table 8-2**) [If applicable, Habitat Plan reference included]	Responsible Party[1]
	Finalize post-permit implementation structure prior to permit expiration. [Chapter 8, Section 8.12]	Implementing Entity
More than 50 years	Continue adaptive management and limited monitoring of biological resources to ensure management actions are working. [Chapter 7]	Implementing Entity

[1] The responsible party is the entity that must ensure the task or milestone is achieved. In many cases, the responsible party may delegate implementation of the task to a third party (e.g., a Permittee, landowner, or consultant).

Table 8-2. Key Deadlines for Plan Compliance

Key Implementing Entity Task With Deadline Tied to Permit Compliance[1]	Deadline(s)	Habitat Plan Reference	Deadline Flexibility
Key Initial Deadlines			
In accordance with the Implementing Agreement and Joint Exercise of Powers Agreement proposals, establish Habitat Plan implementation organizational structure (i.e., Implementing Entity's Governing Board and Implementation Board)	Prior to issuance of permits by Wildlife Agencies so that Implementing Entity can be issued the permits	Chapter 8, Section 8.2	The Permits will not cover the Implementing Entity's activities until the Implementing Entity has been formed and has submitted an application
Cities and County will consider the adoption of local ordinances to implement Habitat Plan	Within 120 days after the execution of the Implementing Agreement and the last permit is issued by the Wildlife Agencies	Chapter 8, Section 8.5	None
Key Annual Deadlines			
Update fees annually according to Chapter 9	Date to be determined by the Implementing Governing Board within the first 6 months of Plan implementation	Chapter 9, Section 9.4.1, subheading *Automatic Adjustment of Mitigation Fees*	Fee update can be delayed if the federal indices in **Table 9-9** are delayed
Submit annual report to Wildlife Agencies with all required information	By March 15 of each year for the previous fiscal year (July 1 to June 30)	Chapter 8, Section 8.11	Extensions available with prior approval by Wildlife Agencies
Key Periodic or One-Time Deadlines			
Prepare reserve unit management plans	Within 5 years of first acquisition in each reserve unit	Chapter 5, Section 5.2.5	Extensions available with prior approval by Wildlife Agencies
Acquire and enhance land; restore riparian woodland/scrub, wetlands, and streams; and create ponds in compliance with the Stay-Ahead Provision	Applies 2 years after the last ordinance takes effects and is measured annually thereafter	Chapter 8, Section 8.6.1	10% deviation below Stay-Ahead requirements is allowed
Determine the target population size of Mount Hamilton thistle, fragrant fritillary, and Loma Prieta hoita	Year 10	Chapter 5, Sections 5.4.12, 5.4.14, 5.4.15	Extensions available with prior approval by Wildlife Agencies
The Implementing Entity will work with the Wildlife Agencies to conduct a formal and complete review of progress toward building the Reserve System	Year 20	Chapter 8, Section 8.6.1	None

Table 8-2. Continued

Key Implementing Entity Task With Deadline Tied to Permit Compliance[1]	Deadline(s)	Habitat Plan Reference	Deadline Flexibility
Restore riparian and fresh water marsh and create ponds to contribute to species recovery	Years 15, 30, 40	Chapter 5, **Table 5-14**	Extend deadline by up to one year with approval of Wildlife Agencies if Implementing Entity demonstrates progress towards milestone
Complete construction of all restoration and creation projects for land cover types and plant occurrences (Coyote ceanothus, smooth lessingia, and Metcalf Canyon jewelflower)	Year 40	Chapter 5, Section 5.3.1 subheading *Acquisition and Restoration Requirements for Aquatic Land Cover Types*, and Chapter 5, Sections 5.4. 11, 5.4.16, and 5.4.17	Success criteria for created plant populations, created ponds, and restored riparian/wetlands will be proposed in reserve management plans and restoration/creation designs. Success criteria in some cases may not need to be demonstrated by year 40, but would have to be demonstrated by the end of the permit term. The Wildlife Agencies would review these proposals as they are submitted during Plan implementation
Acquire all land for the Reserve System according to the acreage requirements in Chapter 5 by land cover type, conservation analysis zone, and landscape linkage	Year 45	Chapter 5, Section 5.3.1; **Tables 5-11, 5- 17, 5-18**; **Figure 5-9**	Extend by up to two years with Wildlife Agency approval if Reserve System is within up to 5% of completion
Acquire modeled habitat for covered species in the Reserve System according to the requirements in Chapter 5	Year 45	Chapter 5, **Table 5-19**	Extend by up to two years with Wildlife Agency approval if Reserve System is within up to 5% of completion
Develop a Wildlife Agency-approved plan to address the continuing obligations of the Implementing Entity beyond the permit term	Year 45-47	Section 9.4.4 subheading *Funding for Post-Permit Management and Monitoring*	None

[1] Responsibility for all tasks lies with the Implementing Entity unless otherwise stated.

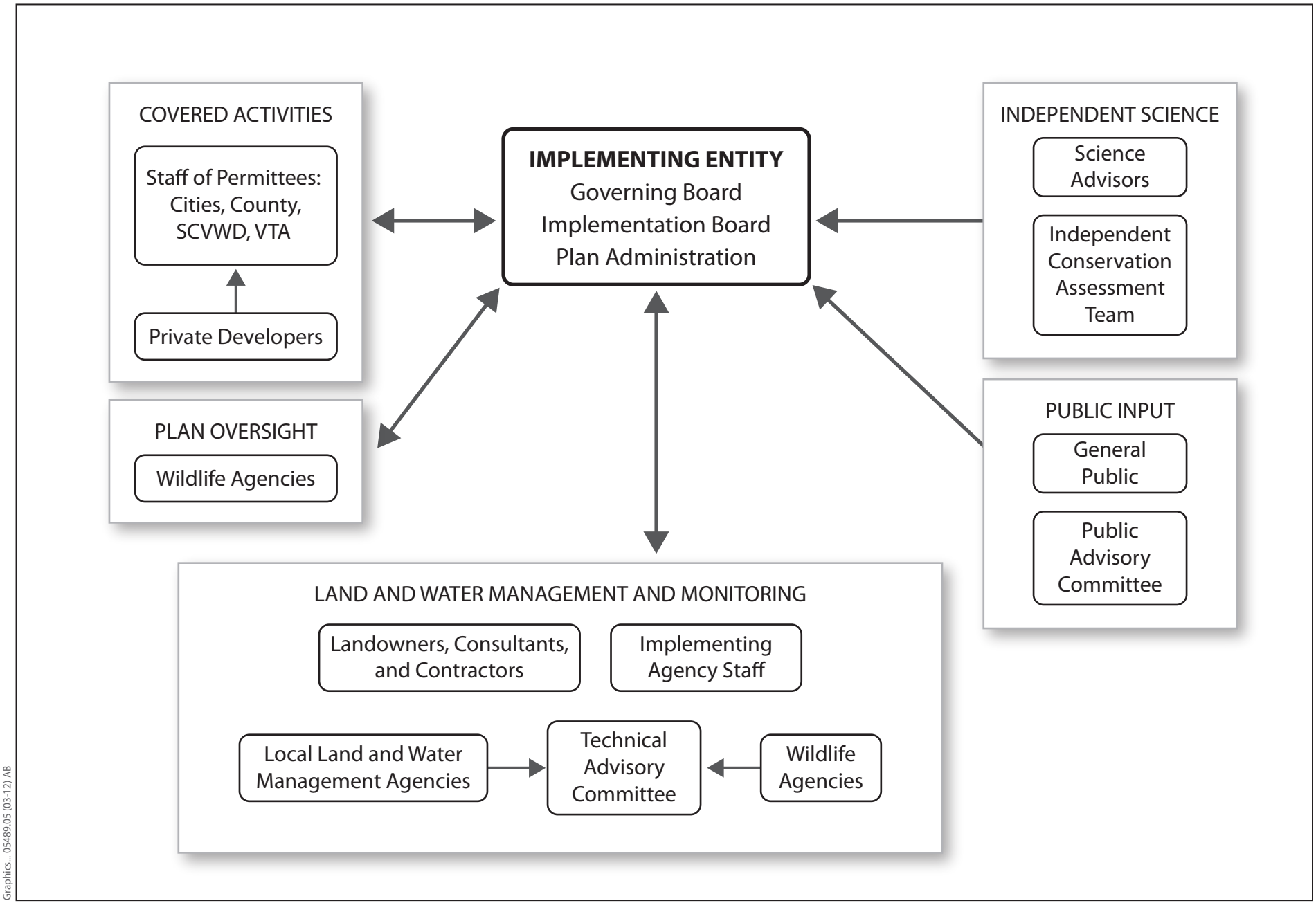

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Figure 8-1
Relationship of the Implementing Entity to External Parties

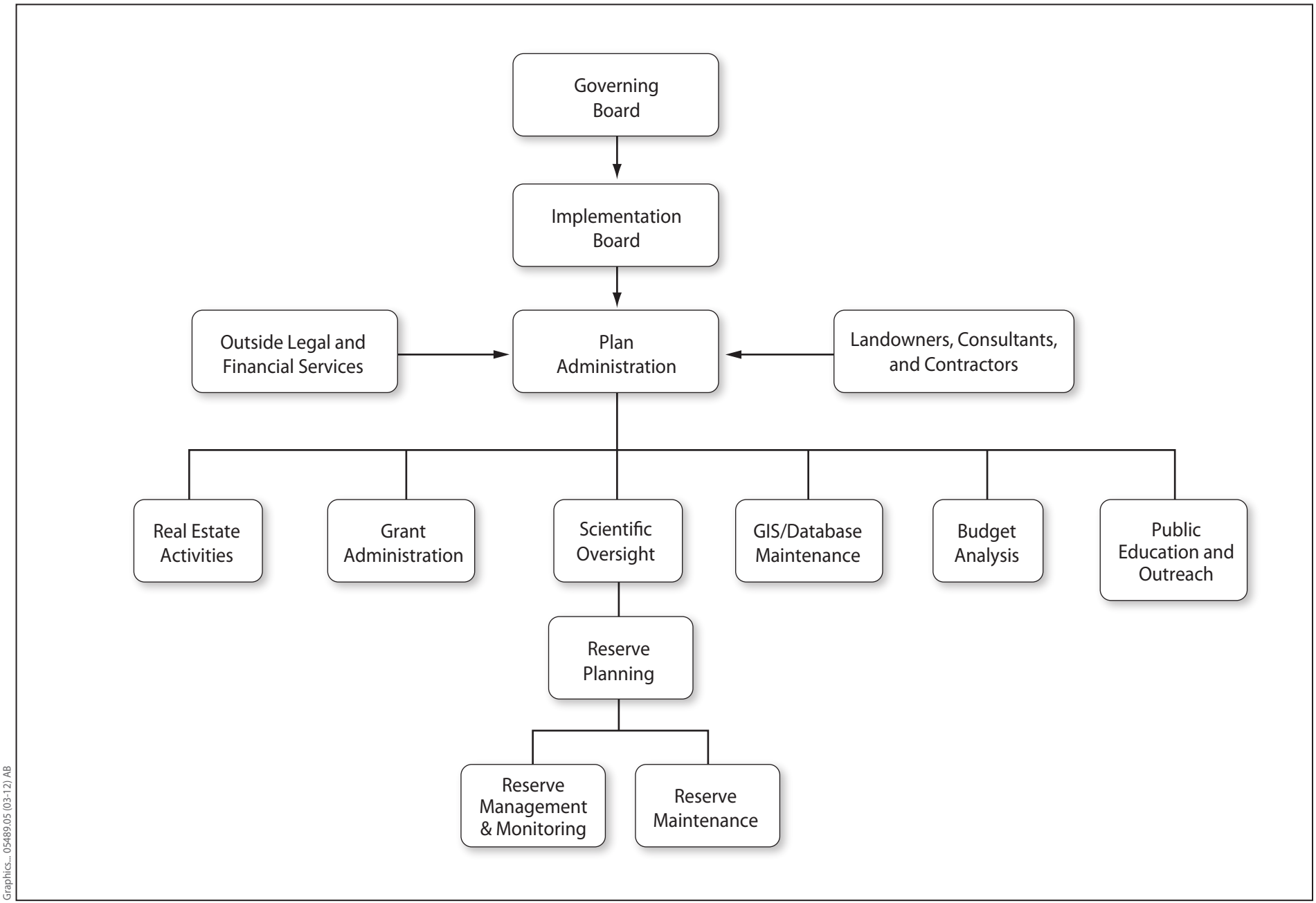

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Figure 8-2
The Functions and Roles of the Implementing Entity

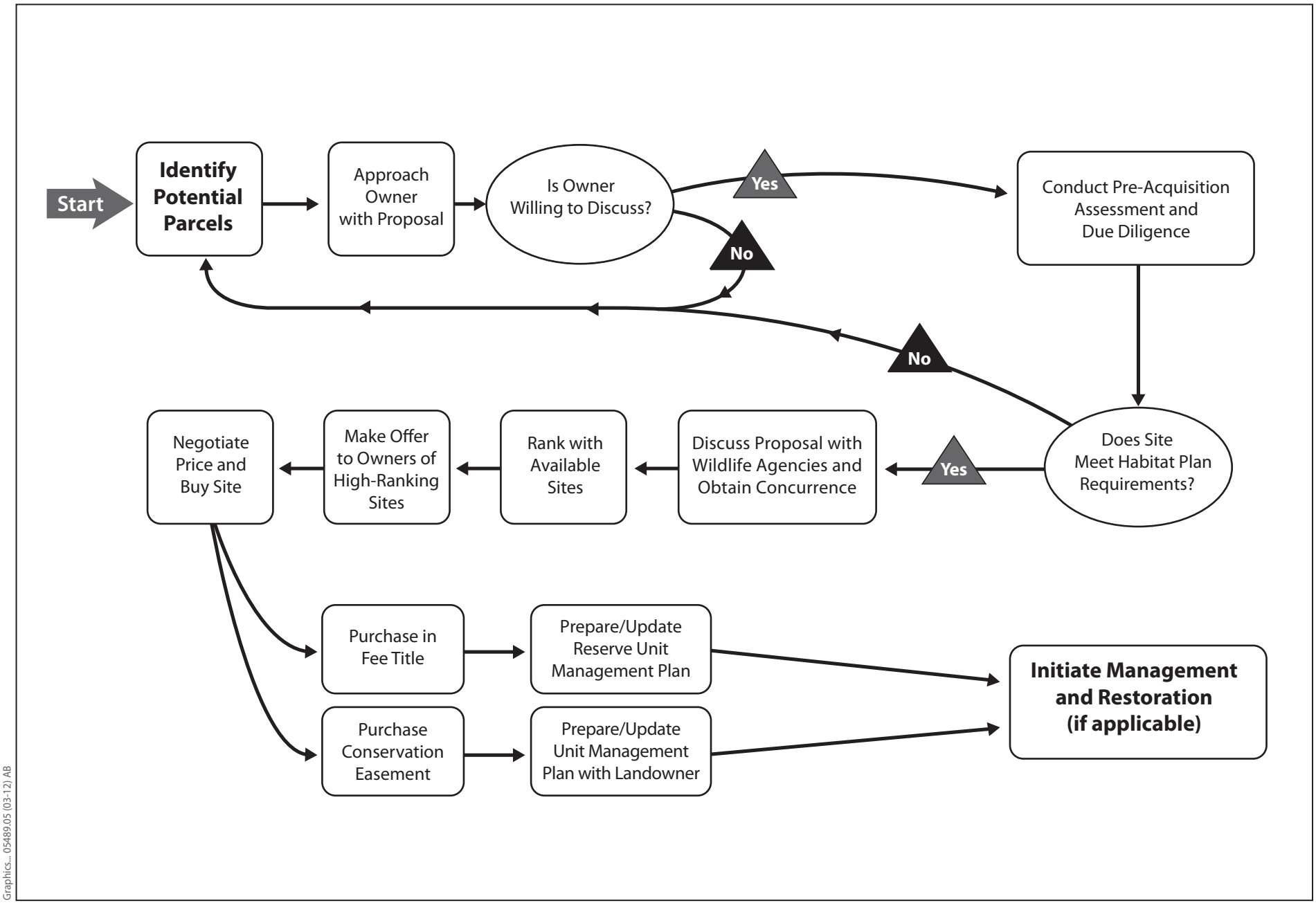

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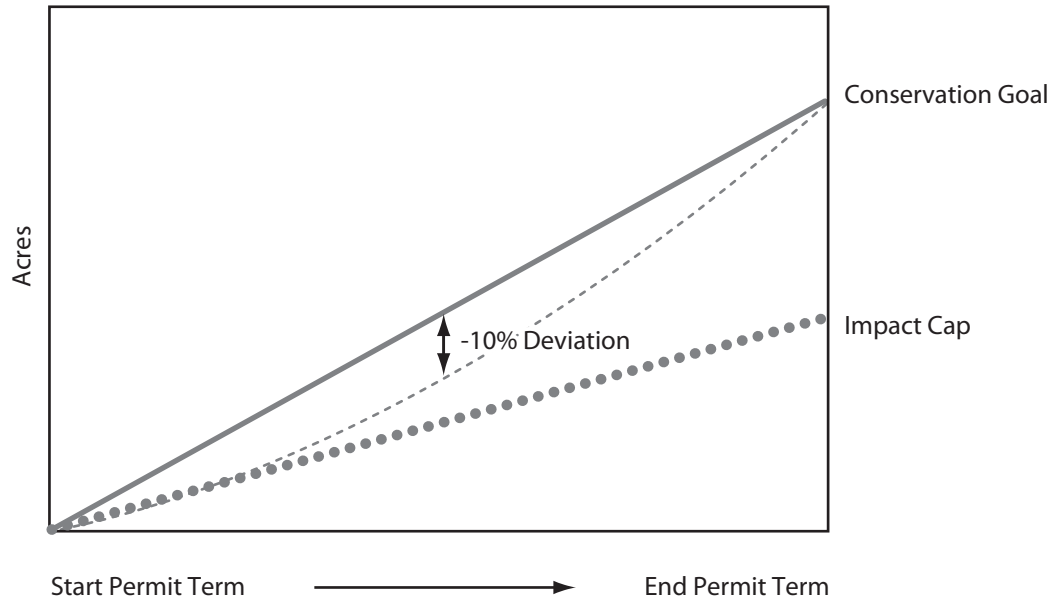
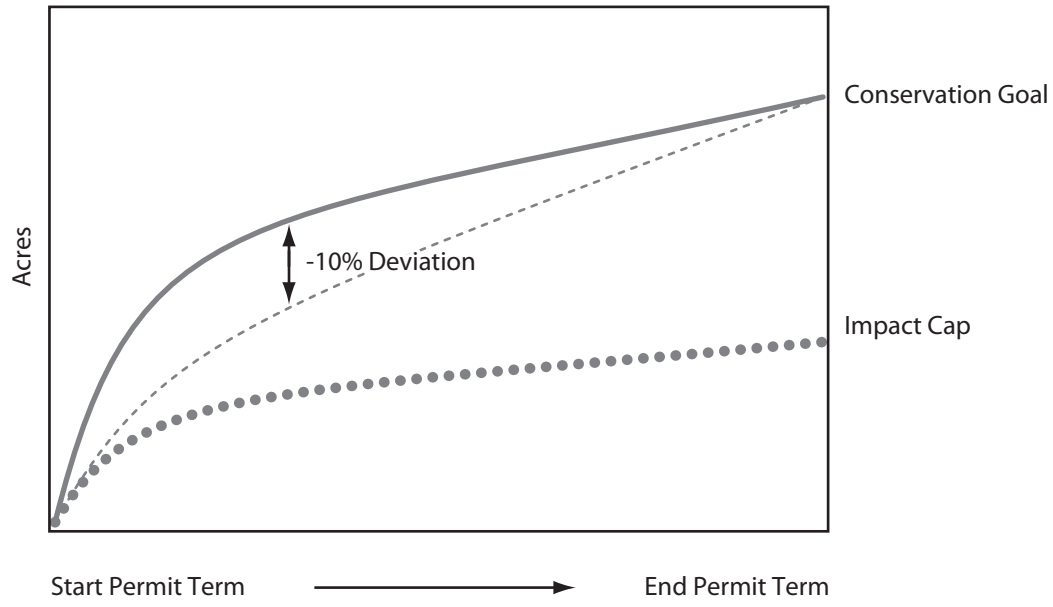
Figure 8-3
Land Acquisition Process



a. Theoretical rate of impacts and conservation if impacts occur at an even rate (linear) throughout the permit term.



b. Theoretical rate of impacts and conservation if most impacts occur early in permit term.

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Figure 8-4
Illustration of the Stay Ahead Provision

Chapter 9
Costs and Funding

9.1 Introduction

This chapter describes the method used to estimate the financial resources (costs) and funding needed to implement the Habitat Plan over the 50-year planning horizon. Fees and other funding sources that support implementation of the Plan are identified, as is the funding needed to support ongoing management of the Reserve System after the permit term ends and funding adequacy.

As described in Chapter 1, as of the completion of this Plan the Local Partners were working with the Corps to develop a Regional General Permit for this Plan. Any additional costs associated with implementing the Regional General Permit are not accounted for in this chapter.

9.2 Cost to Implement the Habitat Plan

Estimating the full costs of the Habitat Plan was an essential step to demonstrate adequate funding necessary to meet regulatory standards. In order to provide enough funding, all costs associated with the conservation actions had to be identified. Because of the geographic scale of the Plan, the complexity of the conservation actions, and long time scale over which these actions will occur, the cost estimating process involved many assumptions. These costs are identified for planning purposes only to estimate funding levels needed to implement the Plan. The Implementing Entity will be responsible for annually preparing and approving a budget for Plan Implementation, based on current information and projections regarding Habitat Plan assets, revenues and expenses.

Major cost categories are listed below and summarized in this chapter.

- Land acquisition.
- Reserve management and maintenance, including adaptive management.
- Habitat and covered plant occurrence restoration/creation.
- Monitoring, research, and scientific review.
- Program administration.

- Contingency.
- Costs in perpetuity.

The anticipated cost of each category is shown in **Table 9-1** which summarizes total costs, capital costs, and operational costs for the Habitat Plan. All costs are in 2010 dollars[1]. Costs are also estimated after the permit term as an average annual cost. Cost components expected after the permit term in perpetuity are described in Section 9.3.7 *Costs in Perpetuity*.

9.3 Cost Estimate Methodology

To estimate Plan costs, a cost model was developed that identified specific costs in the major cost categories (listed above) needed to fulfill terms and conditions of the Plan (**Appendix G** provides the assumptions and output of the model). The cost model was designed to demonstrate that Plan-related costs were accounted for and reasonably estimated. The model structure was refined and expanded from cost models developed for three large, complex regional HCPs and NCCPs[2]. The goal of the cost model was to conservatively estimate expenses of the Implementing Entity over the permit term so that overall costs are understood. This allows the Local Partners to estimate costs over the lifetime of the Plan and post-permit costs so that funding needs can be determined and a fee structure developed.

During Plan implementation, the cost model can be updated to assist the planning process as the assumptions are refined. Model assumptions are listed and described below by cost category and built into the model to facilitate updates. It is assumed that all cost components will increase due to inflation over time; as such, these were tied to cost-of-living statistics[3]. Cost assumptions for operations, maintenance, and administration were developed using local comparable cost data from land management agencies in the study area (County Parks and Open Space Authority) and the Local Partners when available, and from other sources where data from local agencies were unavailable[4]. A separate land valuation analysis was used to develop land acquisition cost estimates (see Section 9.3.1 *Land Acquisition* for more detail).

While the Implementing Entity is responsible for ensuring implementation of all of the requirements described in Chapter 8, it is assumed that that the Implementing Entity will leverage the resources of Local Partners when possible to use funding as efficiently as possible. As such, it is expected that local land

[1] Costs will vary over the 50-year permit term primarily due to the size of the Reserve System. To predict the general timing of funding needs, costs are summarized by 5-year periods except for Year 0, which contains initial start-up expenses. However, the cost model will be used during implementation to forecast start up costs.
[2] The Lower Colorado River Multi-Species Conservation Plan (approved), the East Contra Costa County HCP/NCCP (approved), and the Placer County Conservation Plan (an in-process HCP/NCCP).
[3] The Consumer Price Index (CPI) for the San Francisco-Oakland-San Jose Metropolitan Service Area from the U.S. Bureau of Labor Statistics was used as needed to increase cost estimating factors during the planning process.
[4] Model cells are color-coded to indicate data sources. See **Appendix G**.

management agencies and other entities will perform many of the functions of the Implementing Entity. In this case, the Implementing Entity will be "outsourcing" implementation tasks to these organizations and paying them to act on the Implementing Entity's behalf. The costs summarized in this chapter are therefore estimates of expenses incurred by the Implementing Entity or payments to contract agencies, landowners, consultants, or contractors to perform their work.

The assumptions used to develop land acquisition and management costs warrant additional discussion. Several acreage figures appear only in the cost model and do not correlate to conservation strategy requirements. The total size of the Reserve System will be at least 46,496 acres and up to an estimated 46,920 acres (Chapter 5). This includes 33,205 to 33,629 acres of new acquisitions that fulfill specific land cover requirements. However, the cost model assumes that new acquisitions for the Reserve System will total 36,100 acres (**Table 9-2**). This is because the cost model assumes that some "non-target" acres will be acquired in addition to targeted land cover types. For example, an acquired parcel may include land cover types without acquisition, restoration, or creation requirements, such as agricultural or developed land cover types. In addition, up to 13,291 acres of existing open space will be contributed to the Reserve System (**Table 5-5** and **Table 9-2**). Acreages used to estimate management and monitoring costs are based on acreages consistent with the conservation strategy (**Table 9-3**) and do not assume management or monitoring costs for the "non-target" land cover types that are included in the acquisition costs.

Details of each cost category and the key assumptions that were used to develop the Habitat Plan cost estimate are described below. The costs in perpetuity are described in Section 9.3.7 *Costs in Perpetuity*. See the cost model in **Appendix G** for an accounting of all assumptions.

9.3.1 Land Acquisition

Land acquisition is the biggest component of overall Plan costs and acres of acquired land provides the foundation for estimating operational (management and monitoring) costs. Land acquisition is needed to develop the Reserve System to: 1) mitigate impacts from public and private sector development authorized by permits issued for the Habitat Plan, and 2) contribute to the recovery of the covered species.

The proposed Reserve System has two integrated land elements:

1. new land that is acquired (in fee or by easement) to meet the conservation strategy requirements described in Chapter 5 and summarized in **Table 5-13**; and
2. existing open space that is managed to support recovery of covered species.

Existing open space areas proposed for enrollment into the Reserve System have been evaluated to ensure that they offer opportunities to achieve notable benefits

for covered species through additional land management. However, these lands were not included in the land acquisition analysis as they are existing open space.

Land acquisition costs include the price of the land or conservation easement, land transaction costs, and initial site improvements required upon purchase.

Land Acquisition Costs

Land acquisition capital costs, including site improvements, are estimated to be approximately 72% of all capital costs, or approximately $268 million (**Table 9-1**). This estimate relies on the assumption that 50% of newly acquired lands would be acquired in fee title (as opposed to conservation easement), and that a conservation easement is 80% of the cost of fee title. This assumption of 50% fee title acquisition applies to all acquisitions, except for those on the valley floor. On the valley floor, all lands are assumed to be acquired in fee title. As such, the resulting overall percent of fee title acquisitions is assumed to be 52%. Gifts of land or transfer of a conservation easement associated with a development project may occur and would reduce land acquisition costs. However, for the purposes of the cost estimate none were assumed. **Table 9-2** provides a summary of land acquisition acreages.

For this cost model, fee title land values were based on a review of comparable private market sales of open space lands in Santa Clara County and interviews with appraisers, real estate brokers, and land management agencies active in the region[5] and values based on parcel size categories and location in the study area[6]. The land acquisition cost factors used in this cost estimate range from $6,000 per acre to $34,000 per acre. The actual sale price of individual properties over the permit term will vary considerably.

For planning purposes, fee title and conservation easement land acquisitions are assumed to occur evenly through time over the course of the permit term. Land costs are expected to increase over time; mechanisms for addressing these increases are described in Section 9.4 *Funding Sources and Assurances*. Land acquisition and associated costs are expected to be incurred for the first 45 years of the permit term but not beyond it.

Some newly acquired land may need to be stabilized before habitat management, restoration activities, or public access can begin. Site improvements may include demolition or repair of unsafe facilities; repair of boundary fences; repair and replacement of gates; installation of signs (e.g., boundary and landmark signs); road repair and/or removal; and repair and replacement of creek crossings. Cost estimates were based on a cost per acquired parcel basis.

[5] See **Appendix G**: *Assessment of Open Space Land Sales Used in the Santa Clara Valley Habitat Plan Economic Analysis.*

[6] Parcels sizes were grouped into one of three categories: less than 50 acres, 50–250 acres, and greater than 250 acres. The location analysis was based on the five zones that match those defined for the impact assessment of rural development (Section 4.4.1 *Direct Effects* and **Figure 4-1**).

Land Transaction Costs

Land transaction costs cover due diligence activities related to parcels considered for acquisition and reconnaissance-level biological surveys (pre-acquisition surveys).

The process of investigating a parcel of land before acquiring it is considered due diligence. This includes costs for appraisal, preliminary title, boundary surveys, hazardous material assessment[7], and legal description. The model assumes that 25% more parcels will be investigated than will be acquired.

As described in Chapters 5 and 8, pre-acquisition assessments will be required to determine the biological value of any land considered for inclusion in the Habitat Plan Reserve System. Pre-acquisition assessments include surveys for the following characterizations.

- Land cover type.
- Covered species habitat.
- Covered plant occurrences.
- Wetlands and streams (i.e., wetland delineations).
- Covered wildlife populations.
- Landscape linkages and ecosystem functions.

The model estimates the cost of pre-acquisition surveys based on the estimated number of hours per 100 acres required for each type of survey and the cost per hour, including travel costs, for consulting biologists to conduct the surveys.

Land transaction costs are expected only during the first 45 years of the permit term of the Habitat Plan. Land transaction costs will end once the Reserve System has been fully assembled before Year 45 of the permit term.

9.3.2 Reserve Management and Maintenance (Including Adaptive Management)

Once lands have been acquired, the Habitat Plan sets out a program to ensure that the reserves are managed to achieve the biological goals and objectives identified in Chapter 5. Support for reserve management and maintenance must be

[7] A *Phase 1 Site Assessment* is a preliminary investigation to determine if a site might contain hazardous materials. Sites with hazardous materials will be evaluated for potential cleanup; these costs will be weighed against the effect on the Reserve System design should the site not be protected, and a determination will be made whether the site should still be acquired. For costing purposes, it is assumed that sites with positive Phase 2 Assessment results (i.e., sites that may contain hazardous materials) will not be added to the Habitat Plan Reserve System because hazardous material cleanup would be required (sites with hazardous materials with legal mandates for cleanup may still be acquired if they support valuable or unique biological resources).

sufficient to cover the ongoing management and maintenance needs of the Reserve System. These activities are estimated to be $95,360,000 over the term of the permit, or an average of about $1,910,000 annually during the permit term (**Table 9-1**). The estimated cost to manage the Reserve System relied on the size of the Reserve System, the number of Implementing Entity staff (or contract equivalent), and the time period of the permit term. Accordingly, these costs are expected to increase with the size of the Reserve System. However, costs will not grow directly in proportion to the size of the Reserve System because per-acre management costs are expected to eventually decrease due to efficiencies of scale. **Table 9-3** provides a summary of the per acre cost of reserve management and monitoring activities over the permit term. Costs estimates related to management and maintenance activities include those listed below.

- Reserve System staff.
- Purchase of passenger and maintenance vehicles, vehicle repair, and fuel (vehicle insurance is included in Program Administration).
- Leasing vehicles or heavy equipment.
- Construction, maintenance, and operation of field facilities (e.g., workshops) and associated equipment.
- Pre-construction surveys for construction of field facilities.
- Purchase of management equipment and materials (e.g., hand-held tools, safety equipment, irrigation supplies, construction materials, etc.).
- Construction and operation of wells and water pumping facilities.
- Habitat enhancement of all natural communities within the Reserve System, focused on improving conditions for the covered species.
- Invasive species control (e.g., use of herbicides or grazing).
- Enhancement of covered plant occurrences.
- Conservation actions specific to western burrowing owl.
- Maintenance of ponds (e.g., dam repair, dredging).
- Adaptive management, including staff time to evaluate the results of monitoring and external research to determine the effectiveness of reserve management. These costs include staff time and equipment needed to adjust management prescriptions to respond to the changing needs of the species and natural communities in the Reserve System as well as implementation of management actions within the adaptive management framework.
- Developing or maintaining grazing infrastructure for conservation actions, including grazing fences, leases, etc.
- Development of reserve unit management plans for each reserve unit (defined in Chapter 5).
- Construction and maintenance of facilities (e.g., fencing, gates, roads, bridges, culverts) and planning activities.
- Environmental compliance requirements (described below).

- Remedial measures for changed circumstances (described below).

Management activities may be implemented by the Implementing Entity, Local Partner staff, contractors, landowners, or other third parties. Management activities will be undertaken as efficiently as possible given existing constraints. For example, while herbicide application is permitted under the Plan, the County's IPM Ordinance restricts such use. As such, flexibility in how certain management techniques are applied may be limited (depending on the plant species, grazing or prescribed fire may be more cost-effective alternatives).

Adaptive management and maintenance activities within the Reserve System will include any change in the management and maintenance of the Reserve System necessary to meet the goals and objectives described in Chapter 5. These changes will be informed by monitoring described in Chapter 7. Adaptive management and maintenance could include, but are not limited to, enhancement of the permit area through planting, salvage of plants and replanting in a reserve, seed collection for storage in a seed bank, seed bank fees to establish and maintain seed banks, and providing onsite assistance to and oversight of contractors.

As currently designed, the adaptive management decision-making process will be part of the regular duties of Implementing Entity staff. Therefore, costs associated with adaptive management except for external scientific review were assumed to be part of the capital and operational costs of reserve management, including staff time devoted to reserve management.

Reserve management and maintenance employees will have access to the office space of the Habitat Plan Reserve System (covered under the program administration cost category), but their primary office space is assumed to be a field facility. Field facilities are small buildings that will house workshop space, equipment, a manager's office, a shared office for field staff, a locker room, and restrooms. Field facilities also include secure covered parking for maintenance vehicles. The cost for constructing and maintaining the facilities and parking areas is included in the maintenance and management category. The number of field facilities in operation is based on the size of the Reserve System. The estimated cost per year for field facility maintenance and utilities is included for each facility.

Management and maintenance vehicles purchased by the Implementing Entity include four-wheel-drive trucks, all-terrain vehicles (ATV), and ATV trailers. Vehicle and fuel costs are based on the number of each type of vehicle purchased and retired during each 5-year period, the purchase price of each type of vehicle, and fuel and maintenance costs per each type of vehicle per year. Costs are also assumed for renting large equipment as needed including small tractors, loaders, flails, larger tractors, dump trucks, and fire trucks.

The cost for maintenance equipment and materials is based on the estimated cost of equipment and materials per 1,000 acres of reserve per year and the area of reserve in each 5-year period. Maintenance equipment and supplies include but are not limited to hardware, weed control (whips, mowers, flail, herbicide sprayers, seeders), firefighting equipment (e.g., fire pumper, backpack pump,

hand tools), small tools, safety equipment, raingear, small pumps, generators, saws, demolition hammers, cargo containers, water pipes, irrigation supplies, landscape plants, fencing materials (grazing infrastructure), and lumber.

Water will be pumped into existing stock ponds as needed to maintain water levels for their habitat value for covered species and native biological diversity[8]. It is assumed that wells will need to be drilled and pumps will need to be purchased. Water costs are based on the estimated annual cost for well drilling and water pumping per 1,000 reserve acres and the total amount of reserve area in each 5-year period.

Contractors and landowners are expected to be needed for many of the reserve management tasks including but not limited to the following.

- Development of reserve unit management plans.
- Road and bridge construction, maintenance and repair.
- Pond maintenance.
- Major or specialized invasive species management (e.g., pig control, large infestations of yellow-star thistle).
- Preconstruction surveys required in Chapter 6 for management actions that disturb soil (e.g., field facility construction, new fencing).
- Large-scale mowing for fire breaks.
- Fence maintenance and repair.
- Alarm installation and maintenance at field offices.

Involvement of contractors in management planning will likely be higher in the first 5 years of Habitat Plan implementation due to the time required to hire and train Implementing Entity staff and the need for many management plans early in implementation. Implementing Entity staff will be expected to assume most of the management planning work by Years 6–10. Contractor costs are based on the annual amount estimated to be expended for each type of contractor per 1,000 reserve acres and the total amount of reserve area in each 5-year period.

Reserve management and maintenance will be required in perpetuity, although at a somewhat lower level than during the permit term.

Environmental Compliance

Reserve management activities must comply with environmental requirements as described in Chapter 8 *Plan Implementation*. Additional environmental compliance will be needed during implementation for certain land management

[8] Constructed ponds will be sited to minimize their need for supplemental water. Reserve System ponds will be constructed outside of the 100-year flood plain. Existing ponds that provide breeding habitat for covered species, if not sited properly, may need supplemental water to be maintained.

and restoration activities within and outside Habitat Plan reserves. Estimated costs are based on average costs for contracting the preparation and submittal of compliance documents and permit applications. Environmental compliance costs are assumed to include compliance with NEPA and CEQA, Sections 401 and 404 of the Clean Water Act (CWA), Section 106 of the National Historic Preservation Act (NHPA), Sections 1600–1607 of the California Fish and Game Code, and other miscellaneous requirements (e.g., county grading permits, road encroachment permits, stormwater pollution prevention plans). Most CEQA and NEPA compliance costs are expected to be addressed by the EIR/EIS for the Habitat Plan. However, additional CEQA or NEPA review may be required for some projects.

Environmental compliance costs are assumed to vary with the type of compliance and the size and complexity of the project. For purposes of cost estimation, Habitat Plan projects are divided into three size/complexity categories.

- Small/simple (up to 10 acres or up to 0.1 stream mile).
- Medium /moderately complex (10.1–50 acres or 0.1–0.5 stream mile).
- Large/most complex (more than 50 acres or 0.5 stream mile).

It is assumed that Section 404 CWA, Section 401 CWA, and Section 1602 California Fish and Game Code permits will be procured on a per-project basis. Because these costs are generally associated with restoration activities, compliance costs for jurisdictional waters impacts are included in *Habitat Restoration, Creation, and Covered Plant Occurrence Creation* described below. NHPA compliance is assumed to cover cultural resource inventory only when needed for projects with a federal nexus (e.g., Clean Water Act Section 404 permits). If significant cultural resources are found at a location subject to disturbance by management, restoration, or other Plan activities, the Plan activities will be relocated.

All environmental compliance costs are expected to be incurred during the permit term because they are associated with initial reserve management actions and habitat restoration/creation projects. Few environmental compliance costs are expected after Year 40 because construction of all restoration/creation projects will be completed by then. The environmental compliance costs of covered activities unrelated to conservation actions will be borne by the applicants and are not included in this cost estimate.

Remedial Measures for Changed Circumstances

Remedial measure costs are estimated to address the reserve management response to changed circumstances (see Chapter 10 *Assurances* for a description of all changed circumstances and remedial measures). The cost estimate for remedial measures was assumed to be an additional 10% of the operational costs allocated for management activities on reserve lands. Actual allocations for remedial measures will be adjusted each year based on the inflation factors

described in Section 9.4.1 *Habitat Plan Development Fees* subheading *Adjustment of Mitigation Fees*.

The Implementing Entity will maintain sufficient financial reserves to fund remedial actions described in Chapter 10 when they arise. Starting in Year 5 of implementation[9], the Implementing Entity will annually assess its funding reserves and supplement those reserves in order to fund implementation of the most expensive remedial actions that might occur in the coming 5 years, based on historic events and frequency. Funds used to supplement these financial reserves could come from outside the Implementing Entity or from within the Implementing Entity budget (i.e., funds shifted from other Habitat Plan uses). This approach will ensure that adequate funds are available immediately in the event of a changed circumstance occurring.

Annual funding for remedial measures would accrue each year and annual funding for remedial measures would grow each year in proportion of the size of the Reserve System. The combination of these two factors will lead to substantial remedial measures funding reserves generated later in the permit term. Changed circumstances described in Chapter 10 are more likely to occur on a larger scale later in the permit term due to the greater size of the Reserve System and the expected effects of climate change.

As described in Chapter 10, the Implementing Entity is required to implement remedial action if any of the changed circumstances occur. The cost assumptions are made for planning purposes and will not limit the Implementing Entity's obligation to respond to these changed circumstances. Remedial measures for the Reserve System are not required after the permit term so these costs are assumed to apply only during the permit term.

Recreation

Recreation is not a requirement of the ESA or NCCP Act. Any recreation activities within the Reserves System will be funded by non-fee funding sources and, as such, potential costs are not reflected in the cost model. However, recreation elements for the Reserve System could include the following.

- Developing or reviewing and integrating recreation sections for each of the five reserve unit management plans (for each of the expected five reserve units).
- Constructing recreational facilities including trailhead parking areas and access roads, kiosks, gates, signage, picnic sites, emergency phones, restrooms, and multi-use trails.
- Maintaining recreational facilities.

[9] Year 5 is identified as the starting point to ensure adequate funds for remedial measures have accumulated before this time.

However, the Plan includes costs associated with public access as related to law enforcement, such as managing visitor interface with resource management areas, ensuring public safety (see Section 9.3.5, *Program Administration* subheading *Law Enforcement for Public Access*), and fire protection/suppression.

9.3.3 Habitat Restoration, Creation, and Covered Plant Occurrence Creation

Habitat restoration and covered plant occurrence creation costs are estimated to be $92,630,000 over the permit period, on average, $1,850,000, annually during the permit term (**Table 9-1**). The budget covers activities listed below.

- The cost of identifying and prioritizing potential restoration and creation sites.
- Design of restoration/creation projects.
- Development of plans, specifications, and engineering documents.
- Bid assistance.
- Pre-construction surveys for projects within the Reserve System.
- Environmental compliance (covers permitting for impacts to federal and state jurisdictional waters, and streambed alteration agreements).
- Construction within the Reserve System.
- Construction oversight and monitoring within the Reserve System.
- Post-construction monitoring and maintenance.
- Restoration and creation repair necessary to meet success criteria specified in each reserve unit management plan (monitoring component) and site restoration plans.
- Costs associated with using contractors to assist or do any of the restoration/creation components identified in the bullets above.
- Costs associated with the habitat restoration/creation employees.
- Monitoring and maintenance during and after the permit term.
- Contingency of 15% to account for the greater uncertainty in these costs (contingency costs for restoration and creation actions are independent of, and higher than, costs assumed for the general contingency fund described below in Section 9.3.6 *Contingency*).

Enhancement costs are accounted for above in Section 9.3.2 *Reserve Management and Maintenance (Including Adaptive Management)*. The land cover types that will be restored or created under the Habitat Plan are willow riparian forest and scrub, mixed riparian forest and woodland, Central California sycamore alluvial woodland, coastal and valley freshwater marsh, seasonal wetland, ponds, and streams. **Table 5-16** describes plant occurrences that will be created within the Reserve System. The cost is developed for each 5-year period

based on the area of each land cover type that is estimated to be restored during that period. For planning purposes, the pace of restoration is assumed to be constant during the permit term. The actual pace of restoration and creation activities of the land cover types listed above will comply with the Stay Ahead Provision described in Chapter 8 and the interim timing requirements described in **Table 5-14**. Restoration and creation requirements for covered plants species will always occur prior to impacts, except for the Coyote ceanothus (see Chapter 5, Section 5.4 *Benefits of and Additional Conservation Actions for Covered Species*).

Costs for restoration repair include the costs to replant restoration sites in the event that plantings fail due to site conditions, human error, animal browsing, or other factors. These costs are calculated as 15% of the cost to construct an acre or linear foot for each land cover type[10]. Restoration repair costs are assumed to be unnecessary once the performance standards are met. Restoration repair costs do not include costs associated with remedial measures for changed circumstances, which apply to the destruction of restoration sites from foreseeable natural disasters such as flooding and drought (see Chapter 10). Costs associated with remedial measures to deal with changed circumstances are described below in Section 9.3.2 *Reserve Management and Maintenance (Including Adaptive Management)* subheading *Remedial Measures for Changed Circumstances*.

It is expected that contractors will be hired to construct all but the smallest habitat restoration or creation projects due to the specialized equipment, plant propagation, and planting techniques needed. For large-scale projects, a great deal of labor is typically required (e.g., planting seedlings, cuttings, or container stock for riparian or oak savanna restoration projects), which only a contractor can provide. In addition, it is expected that contractors will be hired to design restoration/creation projects, create restoration/creation plans and specifications, assist with construction bids, conduct pre-construction surveys, oversee the construction of habitat restoration/creation projects, and conduct post-construction monitoring and maintenance. Contractor costs are based on the estimated contract value for each type of contract work for each 5-year period. Staff time, equipment, and vehicles for the Implementing Entity are included in this cost category to account for the time needed to hire and oversee contractor designs, specification, and construction.

Construction of all habitat restoration/creation projects will be completed by Year 40 but restoration costs will be incurred throughout the permit term.

[10] This percentage is based on the assumptions that restoration repairs will be needed on a minority of restoration projects, and these repairs will be substantially less expensive than the original construction costs. Additional contingency funds (see Section 9.3.6) could also be used to repair restoration projects, if necessary.

9.3.4 Monitoring, Research, and Scientific Review

Monitoring, directed research, and scientific review costs are estimated to be over $30,230,000 over the permit term and on average, $600,000 annually (**Table 9-1**). Like management costs, monitoring costs were estimated to increase as the Reserve System grows. Per-acre monitoring costs were developed to account for an eventual reduction in cost once staff becomes well trained, protocols are well established, and efficiencies of scale are achieved. Monitoring costs in the first two periods (Years 1 through 10) were relatively larger to account for extra time needed for training staff and working out the details of the monitoring program (e.g., variables measured, monitoring protocols, field equipment, field forms, data analysis, etc.).

The costs of monitoring restoration projects are not included in this cost category so that all restoration costs are reflected in one cost category (and fees on wetland impacts can be more easily calculated). See Section 9.3.3 *Habitat Restoration and Covered Plant Occurrence Creation* above for a description of these unique monitoring tasks and costs.

Monitoring, directed research, and scientific review are described fully in Chapter 7 and **Appendix J**. Monitoring, directed research, and scientific review costs cover the following items.

- Costs associated with Implementing Entity staff conducting some monitoring, directed research, and scientific review.
- Planning, conducting, analyzing, and reporting on monitoring of ecosystems, natural communities, and covered species within the study area.
- Planning, conducting, analyzing, and reporting on monitoring the effectiveness of conservation measures (the cost of monitoring habitat restoration/creation projects is included in the habitat restoration category).
- Monitoring the status of impacted plant occurrences (Chapter 6, Section 6.6.2, subheading *Condition 19 Plant Salvage when Impacts are Unavoidable*).
- California tiger salamander hybridization studies.
- Western burrowing owl population surveys (every 3 years) and other related monitoring.
- Research directed at management and conservation needs of the Reserve System.
- Stipends for Science Advisors and the Independent Conservation Assessment Team in scientific review and meetings.

It is assumed that Implementing Entity employees conducting monitoring, directed research, and scientific review will plan, coordinate, and report on Habitat Plan monitoring. It is assumed that contractors will collect, document, and analyze monitoring data. Contractor costs for collecting monitoring data are based on the estimated number of hours per acre required for each type of

monitoring, the area that will be covered by each type of monitoring in each 5-year period, and the cost per hour for contracting biologists to conduct the monitoring (the cost per hour includes travel costs for the contractors).

Most monitoring and research is expected to occur on the Reserve System, including existing open space identified in Chapter 5 that will be incorporated into the Reserve System. However, some monitoring and research will occur outside the Reserve System in order to achieve the goals of the monitoring program described in Chapter 7. Monitoring costs include a limited amount of monitoring that would occur off the reserves (e.g., along streams and on other public lands to support status and trend monitoring).

Scientific review costs include costs related to scientists serving on the Independent Conservation Assessment Team and scientists providing advice to the Implementing Entity throughout the permit term (see Chapter 7). The Independent Conservation Assessment team is assumed to meet once every five years and a stipend for each of the five members is included in the cost model. An annual stipend for an assumed eight scientists is also included. Stipends for scientists include travel costs. The cost of adaptive management experiments is covered under the cost for directed research and monitoring. The cost of implementing the results of adaptive management recommendations is assumed in the overall cost of reserve management.

All research costs and most monitoring costs are assumed to occur during the permit term. Some monitoring tasks will be required in perpetuity (see Section 9.3.7 *Costs in Perpetuity* for details).

9.3.5 Program Administration

Program administration costs are the overhead or indirect costs to support employees, facilities, equipment, and vehicles needed by the Implementing Entity to carry out Habitat Plan requirements. Program administration also includes estimated costs for insurance, legal and financial assistance, law enforcement and firefighting paid to the County and other land management agencies (e.g., County Sheriff, CalFire), and public outreach and education. Program administration costs are estimated to be $920,000 annually during the permit term (**Table 9-1**). Some program administration costs will be necessary beyond the permit term.

Cost savings in program administration may be realized by partnering with existing land management agencies that already have staff with the required qualifications and have the infrastructure to hire and manage such staff. However, for estimating purposes it is assumed that the Implementing Entity will hire and manage its own staff in its own facilities. This assumption ensures that potential costs of staffing and program administration are not understated.

Administrative costs incurred by Permittees other than the Implementing Entity to fulfill their own responsibilities under the Habitat Plan are not included in the cost

estimates. For example, each Local Partner will incur costs when reviewing applications for take authorization from various project proponents (see Chapter 6, Section 6.3 *Conditions on All Covered Activities*). The participating cities and the County might recover these costs from applicants according to the policies in place at each local jurisdiction. The fee amounts specified in the Plan do not reflect the costs of application review by the local jurisdictions, and revenues from the Habitat Plan fees will not be used to cover these costs. Similarly, the cost of all conditions on covered activities described in Chapter 6 will be borne by the project proponents, either public agencies or private developers.

Staff

Much of the work identified for staff positions may be accomplished by contract resources including contracts with some of the Permittees, non-profit agencies, landowners, or private entities, especially in the early phase of Plan implementation. It is assumed that the Implementing Entity will have an Administrative Director that can function both as an organizational leader and public presence of the implementation effort. It is assumed that data management and analysis, including GIS work, will be contracted to one of the Local Partners or consultants.

Up to 10.5 staff positions are identified in the cost model for the Implementing Entity. Staffing levels at the Implementing Entity will increase slowly over time as the Reserve System grows and responsibilities increase. Staff positions address administrative needs of the program as well as non-administrative needs of the Reserve System. Other staffing mixes could be used by the Implementing Entity to fulfill the obligations of the Plan; the staffing mix described below was used only for the purposes of the cost analysis.

For the purposes of the cost estimate, it is assumed that the following positions will be staffed as administrative personnel within the Implementing Entity according to the roles described in Chapter 8 *Plan Implementation*: an Administrative Director, a Budget Analyst, a Grant Specialist, a Public Education and Outreach Coordinator, and Administrative Staff (some staff are part-time). These positions are proposed for the type of role that will be required to support implementation of the Plan, but the actual staff hired may not exactly correspond to this proposal. The cost-estimates for administrative staff is almost entirely covered in the Program Administration cost category (the assistant position is shared with Reserve Management and Maintenance). Costs for non-administrative personnel in the positions of Reserve Manager/Senior Scientist, Project Manager/Conservation Planner[11], and Field Staff are shared between the program administration, reserve management and maintenance, habitat restoration/creation, and monitoring, research, and scientific review cost

[11] The Project Manager will be managing and coordinating all habitat restoration and creation projects, developing and overseeing contracts and bids, and assisting with Wildlife Agency coordination. Field Staff will be conducting some of the field work necessary to operate the reserve, including conducting management actions, conducting or overseeing monitoring, and assisting with restoration projects.

categories. Staff costs for the Reserve Manager/Senior Scientist[12] are entirely accounted for under the Reserve Management cost category (see Section 9.3.2 *Reserve Management and Maintenance (Including Adaptive Management)* for more detail).

Office Space and Associated Costs

All costs associated with general office operations are accounted for under the program administration category. General office costs include office space and utilities, office equipment including copy and fax machines, an office telephone system, printers, scanners, publications, digital cameras, and a radio base station.

Staff and Associated Costs

Staff-specific costs include employee salaries; benefits (identified by a salary multiplier of 35% to include the cost of benefits such as health insurance, payroll taxes, retirement plan, worker's compensation, disability, and life insurance); computers; office furniture; office supplies; cell phones; portable radios; and training. A mileage allowance is provided for all staff. This allowance is based on a mileage allowance per employee per year and cost per mile. Travel costs are based on days of travel per year and per diem allowance per employee.

Insurance

Insurance costs are an important part of program administration. Insurance costs were included for auto insurance for all Implementing Entity vehicles as well as for professional insurance for the Governing Board members (often known as "directors' and officers' insurance"), general liability insurance to cover public recreational use within Habitat Plan reserves, and professional liability insurance for Implementing Entity staff.

Legal and Financial Assistance

The Implementing Entity will require legal and financial assistance during implementation. Legal resources will be needed to draft and review conservation easements, finalize land purchases, assist with negotiations, and assist with easement violations if they occur. Financial assistance will also be periodically required to review the program's cost/revenue balance and ensure that Habitat Plan fees are adjusted in line with changing land costs and inflation. Legal costs are based on the billing rate for legal contractors and the estimated time contracted per 5-year period; financial analyst costs are based on the estimated cost for financial analysis services per 5-year period. Attorneys and financial

[12] The Reserve Manager/Senior Scientist will be responsible for overall management of all reserve lands.

analysts with each local jurisdiction are expected to provide some support to the Implementing Entity.

Law Enforcement for Public Access

The Habitat Plan Reserve System will increase the need for law enforcement services in Santa Clara County because of the visitor use of the new reserves. To address this impact, the Implementing Entity will pay to cover reserve-related public safety costs on an annual basis. The number of police officers, park rangers, deputies, or peace officers funded per 5-year period is based on the total area projected to constitute designated reserves during the specified period and the predetermined areal extent of reserve that will require the funding of one peace officer.

Public Outreach and Involvement

The Plan includes an annual budget for the production of education materials that may include brochures; doing mailings; holding special events (e.g., groundbreakings and dedications, volunteer appreciation functions); managing volunteer groups; and otherwise involving the public in the implementation of the Habitat Plan. It is anticipated that a volunteer group of docents will be trained early in Plan implementation and that this group will lead reserve tours and conduct educational/interpretive programs. In addition, the staffing plan includes one part-time education and outreach coordinator to design and manage the outreach program (see Chapter 5 for details of this program).

9.3.6 Contingency

To account for uncertainties in costs, a contingency of 3% is included in the model for all costs exclusive of restoration/creation. The contingency fund will be used on a short-term basis to offset any program costs that are higher than predicted by this Plan. Contingency funds are modest because Habitat Plan fees are designed to keep pace with rising Plan costs, particularly for land acquisition (see *Development Fees* below). Contingency funds will be used only when needed to address costs beyond those predicted in this cost estimate and in annual budgets of the Implementing Entity. Contingency funds could be used for:

- buying new or repairing existing equipment,
- acquiring materials not forecast in the budgets,
- adding temporary staff to address new issues,
- acquiring land that is more expensive than planned,
- applying more expensive management techniques in response to adaptive management needs,

- conducting additional monitoring,
- addressing unforeseen administrative costs, or
- other uses.

Adaptive management needs may arise throughout the permit term in response to monitoring results or external data that dictates shifts in management techniques and protocols. Costs for routine adaptive management needs are included in the *Reserve Management and Maintenance* cost category. Additional management needs could be addressed through contingency funding. Contingency funding will generally be used to pay for expected management that simply costs more than budgeted, or for minor adjustments in management that result in higher costs. Because this contingency budget will accrue over time, it is expected to be adequate to supplement the adaptive management budget described above in Section 9.3.2 if necessary. It could also be used to fund other Plan needs.

Contingency costs are assumed to be needed only during the permit term because some Plan costs will disappear (e.g., research) and other costs will drop substantially after the permit term.

9.3.7 Costs in Perpetuity

As described above, some costs are expected to be incurred only during the permit term (acquisition, restoration, environmental compliance, remedial measures, and contingency), while others can be expected after the permit term. Because most of the impacts of the covered activities are permanent (see Chapter 4), many of the conservation actions must be implemented permanently. For example, land acquired for the Reserve System must continue to be managed beyond the permit term to ensure that it retains the biological values enhanced during the permit term. Similarly monitoring must continue beyond the permit term to ensure that management actions are effective.

Overall, annual costs beyond the permit term would be about 61% of average annual costs in the final years of the permit term (**Table 9-4**). Many reserve management activities continue beyond the permit term but capital costs for construction services would be eliminated and management planning would be reduced. The costs for directed research, scientific review, and monitoring plans would be eliminated and on-going biological monitoring costs would be at about one-third the level attained by the end of the permit term. Staffing would be reduced from 10.5 FTE to 4.5 FTE beyond the permit term. Estimated annual costs in perpetuity are shown in **Table 9-4**. **Appendix G** describes the assumptions used to estimate these costs.

The funding mechanisms and responsibility for funding costs in perpetuity are discussed under Section 9.4.4 *Funding Adequacy* subheading *Funding for Post-Permit Management and Monitoring*.

9.4 Funding Sources and Assurances

Methods for assembling and equitably distributing the costs associated with the Habitat Plan have been the subject of extensive discussion and consideration by members of the public; officials from local, state, and federal agencies; and elected officials. The Habitat Plan, which incorporates the input from this diverse group, offers a balanced approach to conserving species and habitats while equitably distributing the costs.

The Habitat Plan establishes a framework for compliance with state and federal endangered species laws and regulations that accommodates future growth in the study area. Without the Habitat Plan, public and private entities whose activities would affect declining species and their habitats would be required to obtain permits and approvals from USFWS and CDFG before undertaking those activities to mitigate the impacts of their activities on the affected species. To comply with the NCCP Act and thereby obtain necessary permits under CESA, the Habitat Plan also provides for contribution to the recovery ("conservation") of the covered species. Proponents of private and public development activities will benefit from this comprehensive approach in several ways: they will be assured of take coverage; they will avoid the time and expense of securing their own regulatory approvals; and they will have certainty and predictability with respect to their permit obligations. Consequently, the mitigation fees imposed to implement the Habitat Plan include some of the costs associated with the conservation activities. However, because a variety of groups will directly benefit from the Habitat Plan, those groups will also share in the responsibility for funding and otherwise implementing the Habitat Plan. This shared responsibility includes all of the costs associated with Plan implementation described in Section 9.3 *Cost Estimate Methodology*. Therefore, the term "mitigation" does not only refer to Federal mitigation requirements under the Habitat Plan. See Section 9.4.3 *State and Federal Funding* for more discussion regarding funding under the Section 6 program.

Plan funding will come from a number of different sources, which fall into one of several categories.

- **Habitat Plan Fees and Land Dedication.** This source includes private and public sector development impact fees and land dedications. Fees are also charged on specialized impacts such as wetlands (wetland fee) and temporary effects (temporary impact fee).
- **Local Funding.** Land in lieu of fees and non-fee local funding will complement fee-based funding sources. County Parks and some Participating Special Entities, including the Open Space Authority, will provide land (in fee or subject to conservation easements) in lieu of fees[13]. These lands that are contributed in lieu of fees count toward the mitigation component of the Plan. Non-fee local funding will take many forms,

[13] County Parks would be able to contribute land in lieu of fees as long as there is an assured funding source such as the Park Charter Fund. If the Park Charter is not renewed, this local funding source would not be available for land acquisition.

including continued and new investments in conservation actions and land acquisition by organizations such as County Parks, the Open Space Authority, SCVWD, and local land trusts that are consistent with the Plan. Additional funding is also expected from local foundations. These non-fee local funding sources (i.e., lands that are not contributed in lieu of fees) cannot be used for mitigation purposes and will be directed towards the NCCP portion of the Plan (i.e., contribution to recovery).

- **State and Federal Funding.** This source includes federal and state grant programs (e.g., USFWS grants under Section 6 of the ESA, Wildlife Conservation Board grants, and state bonds). Some of these funding sources are generally available throughout the state and nation, while others can only be used to implement an approved HCP or NCCP. State and federal funding can only be used for portions of the Plan that contribute to species recovery (not for mitigation), unless a state agency seeks permit coverage under the HCP as a Participating Special Entity (see Section 8.4 *Participating Special Entities*).
- **Interest Income.** The Implementing Entity is expected to gain limited income from interest on revenue not yet spent, plus more substantial revenue from interest on the endowment as it grows prior to its use to fund costs in perpetuity after the 50-year permit term.

Table 9-5 summarizes the expected revenues and their sources over the permit term. Development fee funding will contribute to mitigation of impacts while non-fee funding from local, state, and federal sources will contribute to the conservation needs of the Plan (i.e., the contribution to species recovery). Each funding source is described below. Additional information on funding is provided in the *Santa Clara Valley Habitat Plan Develop Fee Nexus Study* (*Development Fee Nexus Study*) prepared by Willdan Financial Services and Urban Economics.

9.4.1 Habitat Plan Development Fees

This Plan utilizes a variety of private and public development-based fees to fund mitigation that will offset losses of land cover types, covered species habitat, and other biological values. These one-time fees pay for the full cost of mitigating project effects on the covered species and natural communities. Once paid, applicants do not need to find their own mitigation to satisfy state and federal endangered species laws. In addition, these fees should also satisfy all or most of the CEQA mitigation needs for biological resources, as discussed in Chapter 1.

Fees are based largely on the estimated permanent and temporary impacts to land cover types shown in **Tables 4-2 and 4-3**. Land cover impacts are used because land cover is the best predictor of potential species habitat and is applicable to all of the covered species (see Chapter 3, **Tables 3-5 and 3-6**, and the species accounts in **Appendix D**). Impacts to land cover are also used, in part, as the basis of the conservation strategy (see Chapter 5 for details). The following Habitat Plan development fees (development fees) are discussed below.

- Land Cover Fee.
- Endowment Fee Component.
- Plan Preparation Cost Recovery Fee Component.
- Nitrogen Deposition Fee.
- Serpentine Fee.
- Burrowing Owl Fee.
- Wetland Fee.
- Temporary Impact Fee.

This section also describes the process and timing for collecting fees and how fees are adjusted over time.

The following section describes the Habitat Plan development fees, the areas over which they are applied, and how they are calculated. The underlying analysis for the development fee calculations is provided in the *Development Fee Nexus Study*. The development fees used to fund the Plan are summarized in **Table 9-6**. This section also describes the process and timing for collecting fees and how fees are adjusted over time. The Implementing Entity will comply with all applicable provisions of the Mitigation Fee Act as to the deposit, accounting, expenditure and reporting of such fee revenues and any other applicable legal requirements. Exemptions to the fees are described in the following subsections.

Projects or Activities Not Covered by the Plan

Projects or activities not covered by the Habitat Plan do not pay Habitat Plan development fees. See Chapter 2, Section 2.4 for a list of activities not covered by the Plan. In summary, these non-covered activities including the following:

- Existing development at the time of Plan adoption. These areas are considered developed for the purposes of this Plan and are not the focus of conservation actions for natural communities and covered species.
- Private sector activities that do not require a permit from a local jurisdiction as described in Chapter 2.
- Lot line adjustments (this is not covered by the Plan because it results in no impacts to covered species).
- Activities that are excluded from coverage because they do not meet the criteria in Chapter 2, Section 2.3.2, subheading *Private Development Coverage Areas*. These non-covered projects may opt into the Plan at the discretion of the local jurisdiction in consultation with the Implementing Entity.
- Projects for which a project proponent provides written confirmation to the Implementing Entity that the CDFG and USFWS have determined that the activity is not subject to CESA and ESA; or has already received the

necessary take authorizations under CESA and ESA; or has otherwise complied with CESA and ESA. An activity will be deemed to be in compliance with CESA and ESA by the Implementing Entity and thus be exempt from the conditions in Chapter 6 and otherwise comply with the Habitat Plan if the proponent provides the following:

1. Letters from both USFWS and CDFG that specifically refer to the activity and state that the activity is not likely to result in take of any federal or state listed species and will not preclude successful implementation of the conservation strategy for all covered species, or
2. A copy of an incidental take permit issued by CDFG for the activity, and copies of incidental take statements or incidental take permits issued by USFWS that authorize the incidental task associated with the proposed activity.

Exemptions from Development Fees

All development that occurs on land mapped by the Habitat Plan as "urban-suburban", "landfill", "reservoir", or "agriculture developed" land cover types (see Chapter 3 for land cover type descriptions) is exempt from development fees[14], with the exception of the nitrogen deposition fee and burrowing owl fee, if it is not located in or adjacent to a parcel that contains a stream, riparian woodland or forest, wetland, pond, or serpentine. If new vehicle trips are generated, the nitrogen deposition fee described below may be assessed (**Table 9-7b**). These impacts are not tracked or reported by the Implementing Entity.

The category "reservoir" excludes dams, which are subject to Habitat Plan fees. Barns, corrals, ranch homes, and other small patches of existing development were not mapped as these four exempt land cover types because they fell below the 10-acre minimum mapping unit. These sites would also be exempt from the same development fees and not tracked or reported by the Implementing Entity as long as project proponents demonstrate that they were existing at the time of Plan adoption through air photos or other documentation.

Similarly, implementation of conservation actions described in Chapter 5 (or otherwise consistent with the Plan's conservation strategy) in or outside the Reserve System are not charged development fees. They will however be tracked as impacts by the Implementing Entity and reported as supporting the conservation strategy. Most of the adverse effects associated with the implementation of conservation actions are considered temporary.

[14] Some lands inside the planning limit of urban growth have already been approved for development by local land use agencies. These sites are subject to the Habitat Plan development fee if land use approval is still required. However, as described in Chapter 4, these lands were not included in the impact analysis. Similarly, for the purposes of the revenue estimates, Habitat Plan fees were not assumed to be collected on these sites.

The following covered activities are also exempt from Habitat Plan development fees but are tracked as impacts, count towards the Stay-Ahead requirement, and are reported by the Implementing Entity:

- Urban development covered activities (see Section 2.3.2 *Urban Development* in Chapter 2) in Zones A, B, or C (see Zone definitions below) on parcels less than 0.5 acre as long as the parcel does not contain or is not adjacent to a stream, riparian woodland or forest, wetland, pond, or serpentine.
- Additions to existing structures or new structures that are within 50 feet of an existing structure (e.g., a new garage) that result in less than 5,000 square feet of impervious surface as long as no stream, riparian, wetland, pond, or serpentine land cover types are affected. Expansion is measured based on the existing structure's footprint at the time of Plan commencement. Subsequent additions must be added to the original amount to determine whether this threshold has been crossed.
- Construction of recreational facilities within the Reserve System[15].

All of these activities exempt from the development fees are still covered by the permits. These exemptions from development fees overlap with the exemptions from conditions on covered activities described in Section 6.2 *Exemptions from Conditions*. Differences arise in some cases where fees will be paid but the covered activity does not have to conduct any or all surveys (see **Table 6-1**).

A verified land cover map (see Section 6.8.2 *Item 2: Project Description and Map*) and the Fee Zone map (described below) included in the final Habitat Plan will be used to determine which areas are not subject to the land cover fee. If a project proponent or a Permittee wishes to contest the mapped extent of the exempt land cover types on a parcel or project site, the Permittee (or the Implementing Entity in the event that a Permittee contests the mapping) may consider evidence provided by the project proponent documenting the land cover type on the site prior to Plan adoption. Evidence provided by project proponents is subject to review by the local jurisdiction and the Implementing Entity in accordance with the mapping methods described in Chapter 3. Any deviations from the Habitat Plan land cover map and associated fees must be approved by the local jurisdiction and the Implementing Entity.

Determination of Development Fees

New development will pay a share of the costs of implementing the Habitat Plan consistent with mitigating the impacts of development activities.

The analysis takes into account that fees will vary to reflect the actual impact of a development project or public infrastructure project. This variation will be

[15] Instead of paying a fee for construction of infrastructure within the Reserve System, new disturbance for infrastructure does not count toward land cover type land acquisition requirements in Chapter 5, but it does count toward the total Reserve System size requirements.

applied through the use of development fee zones, as described below. The Habitat Plan development fees were established to meet the following criteria.

- Fees will assist in meeting both ESA and NCCP Act requirements.
- Fees generate sufficient funding to offset a proportionate share of Habitat Plan costs.
- Fees are consistent with the general level of biological impact associated with projects in different areas.
- Fees compare favorably with the actual or expected future cost of ESA and CESA permitting on a project-by-project basis, including the costs of uncertainty and project delays.

Land Cover Fee

The primary component of the Habitat Plan development fees is a *land cover fee*. This fee is based on the mitigation of new development's impacts on land cover types at the project site (see below for calculation methods). The basis for the land cover fee is that the primary impact to the covered species is through the direct and indirect loss or degradation of their habitat (see Chapter 4 and **Appendix D** for details on effects to each covered species). Because habitat for covered species is so closely tied to land cover types (see Chapter 3 and **Appendix D** for details), the primary component of the development fee is associated with impacts to land cover types.

Public and private covered activities are subject to the land cover fee for permanent impacts on any land cover type besides urban-suburban, landfill, reservoir, or agriculture developed (a fee for temporary impacts is described below in this section).

Land cover fees tied to the project footprint are designed to address the direct loss and degradation of covered species habitat and natural communities. This fee will vary by geographic location in the permit area, as defined by three fee zones, to account for broad geographic differences in habitat impacts.

Land Cover Fee Zones

As described in Chapter 4, impacts on covered species and natural communities vary according to whether projects occur within existing urban development, in cultivated agricultural areas (mostly in the Santa Clara Valley floor), or in natural land cover types. To account for these differences in impact, the land cover fee will vary based on project location.

Unlike the other developments fees, the land cover fee varies by location. Three *Fee Zones* are defined by a map that determines the land cover fee paid by development (**Figure 9-1**). The Fee Zone map was developed based on the land

cover mapping in the Plan. These three zones correspond to the dominant land cover types, conservation value, and open space value within each Fee Zone.

- **Zone A: Ranchland and Natural Lands[16].** Land within Zone A is strongly dominated by natural land cover types including grassland, oak woodland, and chaparral (**Figure 9-2**). Land uses in Zone A are mostly ranchland, low-density rural development, or public open space. Zone A occurs mostly outside of the Santa Clara Valley floor within the Diablo Range and the Santa Cruz Mountains and adjacent foothills. Development in this zone is expected to have, on average, greater effects on more covered species and natural communities than in other zones.
- **Zone B: Mostly Agricultural and Valley Floor Rural Residential Lands.** Zone B is strongly dominated by agricultural land cover types such as grain, row-crop, hay and irrigated pasture, disked/short term fallowed, orchards, and vineyards (**Figure 9-2**). Zone B also includes much of the rural residential land cover in the study area. Zone B occurs in the Santa Clara Valley exclusive of areas mapped by the Habitat Plan as having urban land cover types. Small adjacent valleys such as the Almaden Valley also contain small areas of Zone B. In general, covered activities that occur in this area have an effect on covered species and natural communities, but to a lesser extent than in Zone A.
- **Zone C: Small Vacant Sites.** Zone C includes specific sites that meet all of the following criteria:
  - Undeveloped sites (all land covers except urban-suburban, landfill, reservoir or agriculture developed).
  - 0.5 to 10.0 acres in size (parcels less than 0.5 acres are exempt from the land cover fee).
  - Surrounded on four sides by one or more of the following land cover types: urban-suburban, landfill, or agriculture developed.
  - Has no stream, pond, wetland, riparian, or serpentine land cover type within the site.

  Sites must meet these four criteria in order to be eligible for the Zone C fee. Similar sites that do not meet all of the four criteria above pay the Zone A or Zone B land cover fee. Development of these areas will result in loss of open space and some habitat values, but impacts will be less than those in Zone B and substantially less than those in Zone A because these areas are already surrounded by development.

Table 9-7a lists the land cover fee by Fee Zone. The land cover fee includes components for recovering the costs of preparing the Habitat Plan and for developing an endowment fund for post-permit management and monitoring costs, in addition to Habitat Plan costs during the permit term. The Plan preparation and endowment fees are described in more detail below.

[16] Fee zone names are provided only as a general guide to the dominant land cover. The fee amount will be determined solely by a parcel's location within a Fee Zone mapped on **Figure 9-1** and the verified land covers present on the site.

Parcels that span more than one Fee Zone will pay fees according to number of project acres in each zone. Prior to implementation, the Implementing Entity will provide each Permittee with detailed Fee Zone and land cover maps to allow local agency staff to process and evaluate applications for Habitat Plan coverage or evaluate their own projects under the Plan. Habitat Plan fees will be adjusted over time to account for inflation (or deflation) according to the methods described below under *Adjustment of Mitigation Fees*.

If a project is located in an area mapped as Zone A or B, the project applicant may provide sufficient information (as required in Section 6.8.3 *Item 3: Land Cover Types on Site*) for the local jurisdiction to determine that a Zone C fee is warranted, or if no land cover fee is required. The Implementing Entity may periodically update the Fee Zones (**Figure 9-1**) as necessary (e.g., when fee adjustments may occur).

Calculation Method of Land Cover Fees

The land cover fees applied in Zones A, B, and C (**Table 9-7a**) were developed to address the Plan's protection, restoration, creation, management, and monitoring costs in the Habitat Plan. The mitigation costs are divided by the projected acres of land impacts to determine the mitigation cost per acre. In the calculation of the acreage of land impacts, impacts in Zone B and C are weighted lower, relative to impacts in Zone A, reflecting the lower average habitat value of land in Zones B and C. The land cover fees for Zones B and C are based on the estimated per-acre effects of development on covered species for each zone, relative to Zone A. Per acre impacts in Zone B are weighted at 69% of impacts in Zone A. Per acre Zone C impacts are weighted at 25% of Zone A impacts.

As described below, mitigation costs per acre of impact to serpentine land cover types are higher than the mitigation cost per acre of impact to other land covers. Therefore, the additional costs of impacts to serpentine land covers are included in the nitrogen deposition and serpentine fees, and are not included in the land cover fees. The land cover fees were determined through the following steps:

1. The share of the reserve acreage that is required to mitigate development impacts was determined by applying a preservation ratio to the number of acres of each land cover type projected to be impacted by development, resulting in the acreage required for mitigation for each land cover type. Preservation ratios vary from 4.0 acres preserved for every impacted acre for the most sensitive land covers, such as serpentine land cover types, to 1.0 or less for land cover types with lower habitat value, such as ruderal or disturbed areas. The preservation ratios are consistent with previously accepted mitigation ratios for projects analyzed on a project-by-project basis outside the Habitat Plan. The share of total Plan costs (**Table 9-1**) associated with the land cover fee exclude costs associated with impacts on wetlands and burrowing owl habitat because these costs are funded by separate fees (see relevant subsections, below). The remaining amount of total Plan costs were allocated between Plan activities associated with serpentine versus non-serpentine land cover types to enable calculation of separate fees for impacts based on these two categories of land cover types.

2. After deducting for costs associated with nitrogen deposition (funded separately by the nitrogen deposition fee) and revenue from the temporary impact fee, the share of total Habitat Plan costs related to development mitigation on non-serpentine land cover types were divided by the total projected impacted acres on land cover types in Zone A, B, and C, weighted by fee zone, to determine the mitigation cost per impacted acre, at the most significant level of impact. This cost per acre is the Zone A land cover fee. The Zone B and C land cover fees are set based on the Zone A land cover fee, using the weighting factors for each zone.
3. Weighting factors for the Zone B and C fees were derived based on the relative habitat and landscape linkage values to the covered species within each zone, the proportional contribution of covered activities within each zone to direct and indirect impacts (including watershed-level effects such as impervious surfaces), and the relative cost of conservation actions within each zone.

How to Calculate the Land Cover Fee

The land cover fee is calculated differently depending on whether a covered activity is located inside or outside of the urban service area. Each situation is described in the following sections.

Inside the Urban Service Area

Within the urban service area, land cover fees on private and public projects will be assessed on the development area (see **Figure 6-1**) except for land designated with a land use of Urban Development or Rural Residential (see **Figure 2-2**) on a parcel that is less than 10 acres in which case, the land cover fee is assessed on the entire parcel. The fee will not be paid on any land set aside for the Reserve System (i.e., conservation easement) or for stream setback that is avoided. Fees assessed based on the parcel will be assessed on the entire parcel regardless of how much land disturbance is proposed at the time of the permit application to the local jurisdiction (i.e., regardless of the project footprint). One exception to this is linear public projects (e.g., in stream and utility corridors), which will be assessed the land cover fee based on the project footprint[17]. In these cases, the project footprint for the purposes of assessing the land cover fee is defined as the area where ground disturbance is conducted or vegetation removal occurs. Another exception is that contiguous areas (irrespective of parcel boundaries or ownership) that are 10 acres and larger (for serpentine land cover, 3 acres and larger) and protected by an easement that precludes development are not required to pay Habitat Plan fees. These lands would not necessarily be incorporated into the Reserve System.

[17] As described above, conservation actions will not be charged development fees, including within stream corridors because they support Plan implementation.

Charging the land cover fee on the entire parcel is justified because little or no habitat value for covered species is expected to remain within the urban service area once all covered urban development occurs, with the exception of creek corridors or areas where only a portion of a large parcel is developed, due to habitat removal, disturbance, and fragmentation and severe indirect and adverse effects (see Chapter 4 for more details on the mechanisms and magnitude of these effects). If subsequent covered activities are proposed on the same parcel, the land cover fee is not charged again (a separate wetland fee may be charged if the second project directly affects a stream, wetland, or riparian area and the wetland fee was not paid previously; see below).

Outside the Urban Service Area

Outside the urban service area, the land cover fee will be assessed on private and public projects based on the development area, as defined in Chapter 6, Section 6.4.4, subheading *Condition 7 Rural Development Design and Construction Requirements* (also see **Figure 6-1** for an illustration). The development area is roughly equivalent to the project footprint but includes a 50-foot buffer around permanently disturbed areas and a 10-foot buffer around temporarily disturbed areas. If a subsequent project is proposed on the same parcel, permanent impact fees will only be paid on areas for which permanent impact fees were not previously paid. Land cover fees are paid on the entire development area, even if certain areas are avoided within the development area.

Stream Setbacks

Lands in the stream setbacks required by Condition 11 *Stream and Riparian Setbacks* in Chapter 6 that are avoided (i.e., not directly impacted by the project) are not subject to the land cover fee. If the development is granted an exception or exemption to the stream setback (see Chapter 6, Section 6.4.6, subheading *Condition 11 Stream and Riparian Setbacks*), the project proponent will be charged the applicable Habitat Plan development fees over the entire development area including the affected setback (the unaffected setback is not charged the development fee).

Endowment Fee Component

As described under *Costs in Perpetuity*, above, the Reserve System will require management and monitoring after the permit term. To guarantee funding for these post-permit costs, an *endowment fee component* will be charged as part of each fee (land cover, nitrogen deposition, serpentine, burrowing owl, wetland mitigation, and temporary impact fees), will be charged and gradually accumulated during the permit term. By the end of the permit term the endowment will be large enough to generate revenue from investment returns that will cover all estimated post-permit costs.

The Habitat Plan cost model estimated that costs for post-permit Reserve System management and monitoring will be approximately $2.9 million annually, in 2010 dollars (see Section 9.3.7 *Costs in Perpetuity*). An endowment fund model was constructed to estimate the revenue needed during the permit term to support this need at the end of the permit term.

Based on the endowment model, an endowment fund of approximately $90 million in 2010dollars would be needed at the end of the permit term to generate average real returns (i.e., inflation-adjusted) of $2.87 million annually (plus $60,000 annually for areas with wetland mitigation). This revenue would be sufficient to fund post-permit term Reserve System management and monitoring, including accounting for inflation after the permit term.

Annual returns on endowment fund balances were assumed to equal 3.25%. This key assumption was based on a current habitat endowment management program operated by the National Fish and Wildlife Foundation (NFWF) under agreement with the California Department of Fish and Game. The 3.25% annual real rate of return is net of NFWF administrative fees. This assumption was corroborated by the County of Santa Clara Finance Agency based on their fund management experience.

The endowment fee will be collected from public and private development fee payers over the 50-year permit term. Assuming fee revenue to the endowment fund accrues evenly over the permit term, annual endowment revenues of $720,000 (plus $10,000 for areas with wetland mitigation) would be needed to, with interest, build a $90 million balance in the endowment fund at the end of the permit term. Over 50 years, endowment fee revenue of $37 million would be needed. This is equal to approximately 11.7% of projected revenue from the development fees (12.2% for areas with wetland mitigation). Therefore, the endowment fee component is set at 11.7% or 12.2% of each development fee, (with the higher rate applied to the wetland fee). **Table 9-8** shows the calculation of the endowment fee component**.**

The endowment fee component may be adjusted based on the change in the CPI from the U.S. Bureau of Labor Statistics for the San Francisco–Oakland–San José Metropolitan Area, as described under *Automatic Adjustment of Fees,* below. An evaluation of the fund balance in the endowment fund and the fund's investment performance will be conducted every 5 years as part of the fee assessments described under *Periodic Assessment and Adjustment of Fees,* below. This evaluation will assess the adequacy of the current endowment fund balance and projected future endowment fee revenue for funding perpetual management costs. Based on this evaluation, the endowment fee component may be increased or decreased so that the projected balance of the endowment at the end of the permit term will be sufficient to fund reserve management and monitoring costs in perpetuity.

Plan Preparation Cost Recovery Fee Component

All of the Plan's development fees include a component to partially reimburse the Local Partners over time for the costs incurred to develop the Habitat Plan between 2005 and 2011. The *plan preparation cost recovery fee component* (also called the plan preparation fee component) includes only the Plan preparation costs funded by the Local Partners. This fee does not include the costs funded by the Section 6 Planning Grants from CDFG.

Only the Plan preparation costs related to mitigation of the impact of covered activities were included in the plan preparation fee. We estimated that the cost of preparing a regional conservation plan that only meets the mitigation requirements (i.e., only includes actions to mitigate covered activities) would have been 80% of the preparation cost of the Habitat Plan.

Table 9-9 shows the calculation of the Plan preparation cost recovery fee component. As shown, the Plan preparation costs allocated to mitigation of covered activities were estimated at $4.2 million, or 1.4% of projected development fee revenue. Therefore, the Plan preparation cost recovery fee is set at 1.4% of each of the Plan's development fees. The Local Partners will not pay the Plan preparation cost recovery fee component for their covered activities. Instead the Local Partners will be reimbursed for the fair share of plan preparation costs associated with private development and special participating entities that did not contribute funding for preparation of the Plan.

Nitrogen Deposition Fee

The *nitrogen deposition fee* addresses indirect impacts of covered activities and is based on the Habitat Plan costs related to mitigating the impacts of airborne nitrogen deposition. As described in Chapter 4, serpentine grassland and serpentine covered species in the study area are particularly sensitive to deposition of airborne nitrogen compounds generated by air pollution resulting from vehicles and other sources. These nitrogen compounds enter ecosystems as nitrogen fertilizer. This increased soil fertility favors nonnative annual grasses over native plant species found in serpentine soils. One native serpentine plant species, the dwarf plantain, is the host plant for the Bay checkerspot butterfly, a key covered species in the Habitat Plan. Serpentine plants covered by the Habitat Plan that will be adversely affected by on-going nitrogen deposition include Metcalf Canyon jewelflower, most beautiful jewelflower, smooth lessingia, Tiburon paintbrush, and fragrant fritillary.

It is expected that serpentine lands in the Reserve System will have higher average per-acre costs for reserve management and monitoring than the average costs for non-serpentine land covers. These higher costs result from the number of covered species occurring in serpentine land cover types[18] and the costs of

[18] At least seven covered wildlife species (**Table 3-5**) and eight covered plants (**Table 3-6**) occupy one or more serpentine land cover types for all or part of their life-history.

managing serpentine reserve lands to prevent the intrusion of nonnative species as a result of nitrogen deposition and other threats. The nitrogen deposition fee includes the management and monitoring costs for serpentine lands acquired as mitigation, over and above the average management and monitoring costs that would be required for the same number of non-serpentine acres.

In addition to serpentine grassland, 13 other land cover types in the Reserve System have been identified as sensitive or potentially sensitive to nitrogen deposition (California Energy Commission 2006). As with serpentine land cover types, the adverse effects of nitrogen deposition are expected to increase management costs in these land cover types in order to mitigate these effects (e.g., increased invasive species control). For land cover types known to be sensitive to nitrogen deposition[19], 20% of the estimated mitigation costs are assumed to be related to nitrogen deposition effects. For land cover types that may be sensitive to nitrogen deposition[20], 10% of the estimated mitigation costs are assumed to be related to nitrogen deposition effects. Both estimates are considered conservative and account for the uncertainty on specific effects. Again, base mitigation costs were estimated using typical mitigation ratios for each land cover type.

Air pollution simulation modeling was conducted to estimate the percentage of nitrogen deposition in the habitat areas that results from air pollution emissions within the Habitat Plan study area, as opposed to air pollution that is transported from other regions to the study area (see summary in Chapter 4 and the technical report in **Appendix E**). The modeling estimated that 46% of nitrogen deposition on habitat areas comes from existing development and vehicle traffic generated locally within the study area. The study area share of nitrogen deposition on habitat areas is estimated to increase to 49% in 2035 and 51% by the end of the permit term in 2060. Based on this analysis, 50% of the Habitat Plan costs related to mitigating nitrogen deposition impacts are allocated to development in the study area through the nitrogen deposition fee.

Table 9-7b lists the nitrogen deposition fee, which is applied to all Fee Zones in the same way. The nitrogen deposition fee will be assessed as a fee per new daily vehicle trip over existing conditions. **Table 9-10** shows the derivation of the nitrogen deposition fee. The Local Partners may substitute an alternative revenue source for the fees that would otherwise apply to new vehicle trips.

While nitrogen emissions come from a variety of sources that include vehicles, it is not feasible at this time to charge a fee on major non-vehicle sources of nitrogen (e.g., point sources such as power plants and industry). As shown in **Table 9-10**, the cost of management and monitoring for serpentine mitigation acres over and above management and monitoring costs for an equivalent number of non-serpentine acres is approximately $5.3 million. The non-serpentine mitigation costs related to nitrogen deposition are approximately

[19] Land cover types known to be sensitive to nitrogen deposition are northern mixed chaparral, northern coastal scrub, mixed oak woodland, foothill pine-oak woodland, mixed evergreen forest, and redwood forest.
[20] Land cover types that may be sensitive to nitrogen deposition are California annual grassland, valley oak woodland, blue oak woodland, coast live oak forest and woodland, freshwater marsh, seasonal wetland, and pond.

$14.9 million. Because approximately 50% of nitrogen deposition on these habitats results from nitrogen emissions in the study area, 50% of the costs related to nitrogen deposition are allocated to the study area and are included in the nitrogen deposition fee.

Serpentine Fee

Plan actions required to mitigate impacts to serpentine land cover types are substantially more costly than mitigation actions for impacts to other land cover types. To reflect the higher mitigation costs, an additional serpentine fee will be assessed on direct impacts to serpentine land cover types: serpentine bunchgrass grassland, serpentine outcrops and barrens, serpentine seep, and mixed serpentine chaparral. This fee is in addition to the land cover fee described above. Mitigation for serpentine impacts is particularly costly because per-acre land acquisition, management, and monitoring costs are higher for serpentine than for other land covers. In addition, the preservation ratio for serpentine is higher than for other land cover types in the study area.

Per-acre costs for serpentine mitigation lands are expected to be higher than the average cost for other reserve lands because it is expected that serpentine lands will primarily be acquired through acquisition of parcels in the 50 to 250 acre size range. Overall, the majority of land acquired for the Reserve System is expected to be parcels over 250 acres, and it is expected that the per-acre acquisition cost of these larger parcels will be less than the costs of 50- to 250-acre parcels (see **Appendix G** for details).

Mitigation costs per acre of impact are also higher for serpentine land cover types than for other land cover types because higher preservation ratios are typically required for impacts to serpentine than for impacts to other land covers. The preservation ratio to mitigate serpentine impacts is assumed to be 4.0 acres preserved for each acre of impacts, compared to mitigation ratios of 0.5 to 3.0 for other land cover types in the study area.

The serpentine fee was calculated using the same method described above in the *Calculation Method of Land Cover Fees* subsection. The only difference is that in step 2 of the method described in that subsection, serpentine costs and acres of impacts on serpentine land cover types are used to calculate costs per acre of impact, instead of non-serpentine costs and acreage. As described in that step, additional costs related to nitrogen deposition on serpentine land cover types are deducted before making this calculation because these costs are allocated to the nitrogen deposition fee (described above). As described under *Nitrogen Deposition Fee*, above, serpentine lands also have higher management and monitoring costs than other land cover types in the Reserve System.

The serpentine fee will be imposed based on the acreage of impacts to serpentine land cover types as mapped in the field (see Section 6.8.3 *Item 3: Land Cover Types on Site*). In the fee schedule (**Table 9-6**) the serpentine fee is calculated as the additional cost over and above the land cover fee so the serpentine fee is imposed in addition to the land cover fee. The serpentine fee is also imposed in

addition to the nitrogen deposition fee that would apply to the project because the cost of nitrogen deposition impacts are accounted for separately in the nitrogen deposition fee. The serpentine fee will be adjusted over time to account for inflation (or deflation) according to the methods described below under *Adjustment of Mitigation Fees*.

Burrowing Owl Fee

If a covered activity occurs in occupied burrowing owl nesting habitat as defined in **Figure 5-11**, a *burrowing owl fee* will be paid by the project applicant. This fee will be in addition to the land cover fee. The burrowing owl fee is charged on the area on which land cover fees are levied. A portion of the fee may be waived if a portion of the site is set aside in a conservation easement or management agreement with the Implementing Entity to manage the site for burrowing owl habitat consistent with the Habitat Plan. In these cases, the burrowing owl fee will not be charged on the portion of the site subject to the easement or management agreement.

The burrowing owl fee was determined by the cost to implement conservation actions specifically designed for the western burrowing owl (see Chapter 5, Section 5.4.6 *Western Burrowing Owl* subheading *Burrowing Owl Conservation Priorities*) and the estimated impacts to occupied nesting habitat (see Chapter 4, Section 4.6.4 *Western Burrowing Owl*). These costs are itemized in **Appendix G**. The fee of $50,438 per acre was calculated by dividing the costs of the conservation actions, plus remedial and contingency funding needed for the burrowing owl conservation strategy, by the expected impacts to occupied nesting habitat (198 acres), plus endowment and Plan preparation costs (((($8,570,000 + $260,000)/198)+ $5,218 + $624) (**Table 9-6).**

The burrowing owl fee will be adjusted over time to account for inflation (or deflation) according to the methods described below under *Adjustment of Mitigation Fees*. The burrowing owl fee will be imposed on impacts to occupied nesting habitat based on the most recent modeled habitat map maintained by the Implementing Entity.

Example Development Fee Calculations

Example 1 (urban project 1): *A project is located in an area mapped by the Habitat Plan as "urban-suburban" (i.e., existing developed area). The project site does not contain, and is not adjacent to, streams, riparian areas, wetlands, ponds, or serpentine. The site is also not in burrowing owl nesting habitat. Because the project is located on an exempt land cover type, it does not pay the land cover fee. The nitrogen deposition fee is calculated by multiplying the estimated new vehicle trips (i.e., daily trips generated above the pre-project condition) by the per-vehicle-trip nitrogen deposition fee in* ***Table 9-7b****.*

Example 2 (urban project 2): *A landowner of a 1.2-acre parcel in Gilroy wants to build a new single-family home on most, but not all, of the parcel. The parcel is within Zone B (**Figure 9-1**). The land cover fee is calculated by multiplying the total parcel size, 1.2 acres, by the Zone B per-acre fee in **Table 9-7a**. Because the project is new, it will generate new vehicle trips. The nitrogen deposition fee is calculated by multiplying the estimated new daily vehicle trips by the per-vehicle-trip nitrogen deposition fee in **Table 9-7b**. The two fees are added to arrive at the total Habitat Plan fee for the project, as long as wetlands are avoided (see below). Additional Habitat Plan fees may be assessed as a result of temporary impacts (e.g., leach field construction) and/or impacts to streams and wetlands, as described below.*

Example 3 (rural project): *A landowner of a 40-acre parcel proposes to build a single-family home on 1.5 acres of this parcel. The parcel is located entirely within Fee Zone A (**Figure 9-1**). The base development fee is calculated by multiplying the base fee in Zone A (**Table 9-7a**) times the development area of the project. The development area will be slightly larger than the 1.5-acre project footprint because of the buffer added to the project footprint that accounts for indirect impacts (**Figure 6-1**). Because the project is new, it will generate new vehicle trips. The nitrogen deposition fee is calculated by multiplying the estimated new daily vehicle trips by the per-vehicle-trip nitrogen deposition fee in **Table 9-7b**. The two fees are added to arrive at the Habitat Plan development fee for the project. Additional Habitat Plan fees may be assessed as a result of temporary impacts (e.g., leach field construction) and/or impacts to streams and wetlands, as described below.*

Wetland Fee

Permittees or private project proponents are required to map all wetlands, ponds, streams, and riparian woodland as part of their Habitat Plan Application Package (see Chapter 6, Section 6.8.4 *Item 4: Map of Wetlands, Ponds, Streams, and Riparian Woodlands*). Permittees or private project proponents that impact wetlands, ponds, streams or riparian woodland/scrub will be required to pay an additional *wetland fee* on top of the other development fees. **Table 9-11** lists the applicable fees on wetland, riparian, and stream land cover types. See below for how to calculate these fees.

The wetland fee is intended to pay the full cost of restoration or creation of these land cover types, including design, implementation, post-construction monitoring, and remediation through the permit term.

As described in Chapter 5, mitigation requirements for wetland, stream, pond, and riparian woodland/scrub impacts include both preservation and restoration/creation. The wetland fee will cover the cost of wetland, stream, and riparian restoration or creation, but not wetland, stream, or riparian preservation. The cost of preservation of these land cover types is included in the land cover fee because land prices will not be significantly affected by the presence of these land cover types, and most restoration/creation will occur on land already owned by the Implementing Entity. Therefore, for every acre of impact on wetlands,

streams, ponds, and riparian woodland/scrub, applicants will pay the appropriate land cover fee (according to fee zone) towards land acquisition and the conservation program as a whole, as well as a wetland fee to cover the costs of successful restoration or creation. Wetland fees vary by wetland type to account for the different costs of restoration and the different mitigation ratios required (**Table 9-11**). **Table 9-11** also lists the accepted methods for determining the area to which the wetland fee applies. See the *Development Fee Nexus Study* for the calculation of wetland fees by wetland type. A wetland map completed by a qualified biologist (see Chapter 6, Section 6.8.4 *Item 4: Map of Wetlands, Ponds, Streams, and Riparian Woodlands*) will assist the local jurisdictions and the Implementing Entity in determining appropriate wetland fees.

Calculating Fees for Wetland and Pond Impacts

The fees for impacts to coastal and valley freshwater marsh, seasonal wetland, and ponds is calculated by multiplying the applicable wetland fee (**Table 9-11**) by the acres of impact to the wetland or pond. As described in Chapter 6, Section 6.5, subheading *Condition 12 Wetland and Pond Avoidance and Minimization*, covered activities that do not completely avoid indirect effects to wetlands will be considered permanently impacted. The area of indirect effects, as determined by the local jurisdiction or Implementing Entity, will be added to the area of direct effect when calculating fees for wetland and pond impacts. Exceptions to this are described further in Condition 12. If a wetland or pond occurs in a stream, only one of the fees is paid in that section of the stream (i.e., the fee on stream impacts is not additive to the fee on impacts to in-stream wetlands or ponds). The Implementing Entity will determine which fee is to be paid when wetlands or ponds occur in streams. (Typically the higher of the two fees would be paid.)

Calculating Fees for Stream and Riparian Woodland Impacts

The fee on impacts to streams is calculated by applying the linear distance of stream impact, as measured along the stream centerline, to the stream fee per linear foot (**Table 9-11**). Impacts that occur within the ordinary high water mark of a stream channel will be counted as a stream impact. Impacts that occur on one side of the stream channel will be assessed the fee in the same way as impacts that occur on both sides of the stream channel. As described above, if the stream supports a wetland, only one fee will be paid, as determined by the Implementing Entity.

The fee for impacts to riparian woodland and sycamore alluvial woodland are calculated based on the acres of direct impacts to woodland or scrub vegetation as measured by the outer limit (the side away from the stream) of the tree or shrub canopy (drip line). Impacts to riparian woodland or sycamore alluvial woodland that also affect the stream channel will pay both fees (i.e., the fee on riparian impacts is additive to the fee on stream impacts).

Aquatic Restoration or Creation Provided in Lieu of Wetland Fee

Unlike other development fees, wetland fees cannot be waived in lieu of land dedication (see *Land Provided in Lieu of Development Fees* below for details). However, project proponents have the option of restoring, managing, and monitoring their own wetland, stream, or riparian mitigation site in lieu of paying all or part of the wetland fee. Project proponents may propose to the Implementing Entity to create, manage, and monitor their own pond mitigation site in lieu of paying all or part of the wetland fee. In both cases, construction of restoration and creation of aquatic features will be initiated prior to or concurrent with construction of the covered activity, the mitigation will be consistent with the requirements of Chapter 5, the site will be protected by a conservation easement[21], and management and monitoring will be funded in perpetuity. Applicants may propose paying the Implementing Entity to manage and monitor the site after construction is completed. Construction of all aquatic restoration and creation projects must comply with the Stay-Ahead provision of this Plan and must be completed by Year 40, consistent with the requirement for the Implementing Entity to do the same (see Chapter 5).

The Implementing Entity must approve requests to perform aquatic restoration or creation in lieu of paying the wetland fee. The Implementing Entity will evaluate proposals to perform restoration and/or creation in lieu of wetland fees based, in part, on the history of the applicant performing successful wetland restoration elsewhere and whether the restoration or creation project is consistent with the conservation strategy and requirements of the Plan. Restored and created aquatic features must also meet the reserve design and assembly criteria in Chapter 5. In order for the Implementing Entity to approve aquatic restoration or creation in lieu of fees, the local jurisdiction approving the project must secure a guarantee through conditions of approval that the restoration or creation will be implemented and remediated if success criteria are not met. In the case of a Permittee proposing the restoration or creation in lieu of wetland fees, the Permittee must sign an agreement with the Implementing Entity to provide this guarantee. After success criteria are met and the applicant assures funding, the Implementing Entity will assume all management and monitoring responsibility of the restoration or creation site as part of the Reserve System.

To satisfy Clean Water Act Section 401 and 404 requirements, aquatic restoration and creation may also need to be approved by the Corps and Regional Board and meet the success criteria agreed upon by these agencies.

Alternatively, applicants may purchase appropriate wetland restoration or creation credits in a private mitigation bank in the permit area that has been approved separately by USFWS and CDFG and pre-approved to service the Habitat Plan. Currently there are no such banks in the study area, but they may

[21] As described in Chapter 5, Permittees may implement some stream and riparian restoration projects outside of the Reserve System (i.e., without a conservation easement).

be established. Guidelines for the use of mitigation banks are found in Chapter 8, Section 8.6.2, subheading *Private Mitigation Banks*.

Temporary Impact Fee

As described in Chapter 2, there are many covered activities that are ongoing and that result in small, localized, temporary impacts on natural land cover types. As described in Chapter 4, the majority of these activities, particularly those within urban areas, will have little or no effect on covered species or their habitats. Some ongoing activities, however, are expected to have substantial temporary impacts on covered species due to their large footprint, location in natural land cover types, effect on local soils or hydrology, or a combination of these factors. Temporary impacts are defined in Chapter 4 as "direct impacts that alter land cover for less than one year and that allow the disturbed area to recover to pre-project or ecologically improved[22] conditions within 1 year (e.g., prescribed burning, construction staging areas) of completing construction."

Specific temporary impacts are subject to the temporary impact fee (see list below of specific activities subject to this fee). Projects subject to the temporary impact fee will pay the fee in one of two ways.

- If the frequency of the impact over the permit term can be predicted, the applicant may pay the fee for infrequent treatments up front, to address all impacts during the permit term. This discounted fee is calculated as a fraction of the full land cover fee. The total fee will be calculated using the formula below.

  Temporary Impact Fee = (Land cover fee × development area or project footprint in acres × (F + R)) / 50

  where *F* = the number of calendar years in the permit term in which the activity occurs and *R* = the number of calendar years expected for the site to return to pre-project conditions (a maximum of 1 year). Temporary impacts are not subject to the nitrogen deposition fee.

  The maximum time allowed for a site to return to pre-project conditions will be 1 year from the end of construction. The project proponent must document to the satisfaction of the Implementing Entity that the disturbance and site recovery occurred at or better than the predicted timeline.

  OR

- The applicant may pay the full land cover fee (see **Figure 9-1** and **9-7a**) and retain the ability to disturb the area repeatedly during the permit term.

  Temporary impacts that occur in the same location repeatedly during the permit term and that pay the full land cover fee will be counted and tracked as a permanent impact. Temporary impact fees paid on a site can be credited

[22] *Ecologically improved* means that the site functions ecologically better than the functions present on the site prior to ground disturbance.

towards any permanent impact fees that may be required on the same site in the future.

As described in Chapter 8, all or a portion of the temporary impact fee can be waived in exchange for land dedication or aquatic restoration or creation, based on the nature of the impact. The amount waived will be determined by the Implementing Entity on a case-by-case basis according to the rules and principles described in Chapter 8.

Temporary impacts that occur within wetland or serpentine land cover types will be assessed a temporary wetland or serpentine mitigation fee according to the formula shown above, but based on the applicable wetland or serpentine mitigation fee (see **Tables 9-6**). Temporary impacts that occur on occupied burrowing owl nesting habitat, as defined in **Figure 5-11,** will also pay a temporary impact fee according to the burrowing owl fee.

Applicants have the option of developing and implementing their own wetland restoration or pond creation project in lieu of the temporary wetland fee. If the applicant's restoration plan is approved by the Implementing Entity, then no temporary wetland impact fee is required. The Implementing Entity will verify that the applicant's wetland restoration and/or creation project is constructed according to specifications and that the project meets its success criteria.

Activities Not Subject to the Temporary Impact Fee

To reduce administrative costs, temporary impact fees will not be assessed on any covered project with impacts of less than 0.25 acre except to wetlands, ponds, riparian woodland, streams, or serpentine.

All covered activities that result in temporary impacts are subject to the applicable conditions described in Chapter 6 and will be tracked against the Plan's impact limits. As described in Chapter 2, some agencies may already have endangered species permits for operations and maintenance activities and will therefore not be subject to the requirements of this Plan or the temporary impact fee (e.g., SCVWD for their Stream Maintenance Program).

The conservation actions described in Chapter 5 and the monitoring actions described in Chapter 7 will not be assessed a temporary impact fee. For example, wetland, stream, and riparian restoration projects conducted for the Habitat Plan may result in temporary impacts. Because these actions support the conservation strategy, they will not be assessed a temporary impact fee.

Mowing of previously maintained flood control channels will have minor impacts and is therefore subject to applicable conditions in Chapter 6 but not subject to the temporary impact fee because the impact analysis assumed these land cover types would be permanently affected during the permit term (these covered activities will pay the appropriate fee prior to impact). Similarly, mowing of existing road rights-of-way that are regularly mowed are subject to applicable conditions in Chapter 6 but not subject to the temporary impact fee.

Sediment removal in artificial off-channel detention basins or groundwater recharge ponds, when free of vegetation, are not subject to temporary impact fees.

Activities on Urban Development or Rural Residential Land Uses Inside the Planning Limit of Urban Growth

Covered activities such as mowing, tree trimming, and other activities resulting in temporary impacts that occur in areas with a land use of urban development or rural residential within the planning limits of urban growth, but excluding San José's Coyote Valley Urban Reserve and South Almaden Valley Urban Reserve, Morgan Hill's Southeast Quadrant, or Gilroy's Hecker Pass, are subject to the conditions described in Chapter 6 but will not be charged a temporary impact fee because the impact analysis assumed these land uses would be permanently affected during the permit term (these covered activities will pay the appropriate fee prior to impact).

Activities Subject to the Temporary Impact Fee

Temporary impacts of any size to wetlands, ponds, riparian woodland, streams, serpentine, or burrowing owl occupied nesting habitat will be charged the appropriate temporary fee regardless of location.

Maintenance of the vegetated portion of on-channel detention basins or vegetated groundwater recharge ponds is subject to the temporary impact fee because these areas are more likely to provide habitat for covered species.

Activities Outside the Planning Limits of Urban Growth with Little or No Soil Disturbance

Covered activities with temporary effects outside the planning limits of urban growth that result in little or no soil disturbance and that are greater than 0.25 acre are more likely to affect covered species than the same covered activities within the planning limits of urban growth. The activities that will be assessed a temporary impact fee for the portion of the project outside the planning limits of urban growth of the participating jurisdictions include, but are not limited to, those listed below.

- Road or trail maintenance along vegetated shoulders where natural land cover types are disturbed or removed.
- Maintenance of public facilities including buildings, utilities, and stormwater treatment where natural land cover types are disturbed or removed.
- SCVWD maintenance activities outside streams, canals, and other facilities (vegetation clearing on dam faces will pay the full land cover fee because it is considered a permanent impact).
- Septic leach fields.

- Vegetation clearing needed for utility line or gas line maintenance (e.g., mowing, disking, herbicide spraying, tree trimming[23]).
- Weed abatement undertaken by Permittees.

Sediment removal in artificial off-channel detention basins or groundwater recharge ponds, when free of vegetation, are not subject to temporary impact fees in the same way as on-channel detention basins or groundwater recharge ponds, as described above. Similarly, vegetation removal conducted by a Permittee to establish a fuel break on private property (e.g., as an enforcement action) is not subject to temporary impact fees.

Activities Outside the Planning Limits of Urban Growth with Soil Disturbance

The following covered activities larger than 0.25 acre include those projects where the area of impact on covered species is larger than the project footprint (e.g., effects on wildlife movement or connectivity). Such activities outside the planning limits of urban growth of the participating jurisdictions include, but are not limited to, those public or private projects listed below[24].

- Pipeline installation, repair, or replacement (trenching).
- Underground electrical transmission line installation, repair, or replacement.
- Underground telecommunication line installation, repair, or replacement.

The Implementing Entity, in consultation with the project proponent and the Wildlife Agencies, will determine an appropriate project impact area subject to the temporary impact fee. These types of activities may have both temporary and permanent effects (i.e., trenching through a wetland complex that permanently alters site hydrology would considered be a permanent effect). In these cases, the temporary impact fee along with other fees described in this chapter could be assessed. Coverage under the Habitat Plan will also be subject to the approval of the Implementing Entity. As an alternative to devoting time and resources to defining a project impact area, project proponents may choose, in consultation with the Implementing Entity, to pay the full land cover fee on the project footprint in lieu of paying temporary impact fees multiple times during the permit term.

Collection of Mitigation Fees

All fees paid by private applicants to participating jurisdictions will be collected by the applicable jurisdiction. Fees paid to participating local jurisdictions will be transferred to the Implementing Entity on a regular basis, but at a minimum,

[23] Tree removal outside the urban service areas of the participating jurisdictions will be treated as an activity with soil disturbance.

[24] The Permittees do not have jurisdiction over some of the activities in this list. However, these projects could be covered by the Plan through the *Participating Special Entities* process described in Section 8.4.

annually. The transfer schedule and process will be determined by the Implementing Entity early in Plan implementation.

All fees paid by public agencies (i.e., the Permittees) will be paid directly to the Implementing Entity according to a process and schedule developed by the Implementing Entity. See *Timing of Mitigation Fee Payment* below.

Adjustment of Mitigation Fees

The dynamic nature of the costs associated with HCP and NCCP implementation, including land acquisition costs and operating, maintenance, and management costs, requires a flexible approach to funding through time. Many existing HCPs have not incorporated sufficient flexibility into their funding mechanisms and, as a result, have found that funding lags behind increasing costs, compromising Plan implementation. This Plan includes two mechanisms for adjusting fee levels: automatic adjustments and periodic assessments. Both adjustments will be performed by the Implementing Entity and provided to all participating local agencies.

Automatic Adjustment of Fees

The two primary costs of the Plan, land acquisition and operations/maintenance, will likely change at different rates over time. Land costs in many areas of California, including the San Francisco Bay Area, have historically increased well above the rate of inflation. The significant demand for housing in the Bay Area and the more limited housing supply have often increased housing prices significantly, in turn increasing the value of developable land. Other Plan costs, including the cost of personnel, supplies, and equipment involved in managing, operating, restoring, and maintaining the Reserve System, will more closely follow the general rate of inflation. To account for these differing rates of inflation, the Implementing Entity will update the development fees automatically on an annual basis by a date determined by the Implementing Entity's Governing Board within the first 6 months of Plan implementation according to the indices and procedures described in **Table 9-12**.

The variation in the cost of land due to site-specific factors means that it is difficult to develop land cost indices; consequently, no such indices are available. However, given the link between the housing market, housing prices, and land costs, housing prices generally provide a more accurate index for land cost inflation than measures of general inflation, especially for land whose value is primarily generated by its development value. The index to be used to adjust the land acquisition cost portion of fees is the annual House Price Index (HPI) from the Federal Housing Finance Agency for the San José–Sunnyvale–Santa Clara, CA Metropolitan Statistical Area for the prior calendar year. The index to be used to adjust the non–land cost portion of fees is the CPI from the U.S. Bureau of Labor Statistics for the San Francisco–Oakland–San José Metropolitan Area. The Implementing Entity may decide to use other indices during Plan

implementation if other indices are developed that better predict the costs of the Plan.

Annual automatic adjustments in development fees will either increase or decrease the total fee per acre. Fees are more likely to go up than down each year. Since 1915 the CPI for this Metropolitan Statistical Area has gone up in 81 of 92 years (88% of the time). Since 1977, the HPI has gone up in this Metropolitan Area in 24 of 30 years (80% of the time).

Periodic Assessment and Adjustment of Fees

To ensure that the fees generated by development and other covered activities are adequately covering their share of Plan costs, two types of fee reviews will be performed on a regular basis. At least every 2 years, the Implementing Entity staff will analyze the fee amounts and compare them to actual and projected costs. The Implementing Entity staff will then report to the Implementation Board on whether the automatic fee adjustments are keeping pace with actual costs to provide an opportunity to adjust fees different than the automatic adjustments.

In addition, every 5 years a fee assessment will be completed to review the costs and their underlying assumptions that were developed as part of the original funding plan. The review could include comparing appropriate land sales in the study area transacted after the start of the Habitat Plan with the original land cost assumptions (see **Appendix G**). The actual costs of operating, maintaining, and managing the Reserve System can also be compared to the original estimates of these costs to determine the actual change in non-land costs. Automatic annual fee increases will resume after the periodic fee assessment and will continue until the next periodic assessment.

Fees may go up or down depending on the results of the assessment.

Timing of Mitigation Fee Payment

For private projects, mitigation fees are required to be paid before or at the time the grading permit for the project is issued. If a grading permit is not required, fees must be paid before or at the time the first construction permit is issued[25].

For public projects, mitigation fees must be paid to the Implementing Entity prior to implementing the covered activity. For public projects conducted by outside contractors, the timing of fee payment may coincide with the award of the construction contract because this represents the time at which the public agency commits to implementing the project.

[25] A grading permit is typically the first permit issued that results in ground-disturbing activity. In cases where there is no grading permit, the fees will be due upon issuance of the first construction permit (e.g., building permit).

Land Provided in Lieu of Development Fees

If a landowner or Permittee conveys a portion of the development site (either in fee simple or a conservation easement) to be included in the Habitat Plan Reserve System and the Implementing Entity and the Wildlife Agencies approve the inclusion, the portion of the property included in the Reserve System would not be assessed the land cover, serpentine, burrowing owl, and/or land cover temporary impact fees[26], as appropriate. Landowners may also provide land separate from development sites for the Reserve System, if approved by the Implementing Entity and the Wildlife Agencies.

In both cases (land provided on or off the covered activity site), landowners or Permittees that convey land to the Implementing Entity may receive credit for the dollar value of these acquisitions against select development fees that might be owed by the landowner or Permittee due to impacts of their covered activities. Land to be conveyed by a landowner or Permittee will be eligible for development fee credit if the land satisfies the criteria described in Chapter 8, Section 8.6.7 *Land Dedication In Lieu of Development Fee.*

Criteria for Determining Fee Credit for Land Provided in Lieu of Development Fees

The value of the conveyance of land to the Implementing Entity and any credit against development fees will be determined by the Implementing Entity on a case-by-case basis. Any land provided in lieu of development fees must contribute toward the implementation objectives and requirements of the Habitat Plan. In quantifying the credit to be awarded, the Implementing Entity will consider all of the following:

- the extent to which the land would contribute toward the implementation objectives and requirements of the Habitat Plan,
- the fair market value of the land based on an appraisal,
- actual land transactions costs, and
- actual costs of biological survey work performed to provide baseline data for the Habitat Plan, if applicable.

The Implementing Entity will award any credits against development fees from land conveyed after the conveyance has been completed.

[26] For sites within the urban service area where the entire parcel is charged the development fees, this means that the portion of the parcel dedicated to the Reserve System would have fees waived in that portion. The acquisition and transactional value of the portion dedicated to the Reserve System also provides a fee credit to the portion of the parcel paying the development fees. Covered activities outside the urban service area only pay a fee based on the development area, so portions of a parcel dedicated to the Reserve System would only provide a fee credit to the fees that apply in the development area.

Fee waivers and credits in exchange for land conveyed will only be allowed when the Implementing Entity determines that acceptance of land in lieu of funds is consistent with the conservation strategy. For example, one of the factors that the Implementing Entity will consider is whether it has sufficient funds available or funding commitments to manage and monitor the conveyed land during the permit term. (See the end of this chapter for a discussion of funding for post-permit management and monitoring.) Funding to ensure management and monitoring of the land conveyed will be provided by the project proponent. Any funds provided by the landowner or Permittee in excess of the amount required to ensure management and monitoring will be credited against any development fees otherwise due. Land cannot be dedicated in lieu of wetland fees and the nitrogen deposition fee.

Implementing Conservation Actions in Lieu of Development Fees

As described above, at the discretion of the Implementing Entity, landowners and Permittees have the ability to provide land in lieu of all or a portion of select development fees or wetland restoration or creation in lieu of all or a portion of their wetland fees. Permittees with special expertise may also provide other forms of conservation besides land acquisition in lieu of all or a portion of all development fees otherwise owed by them. At the discretion of the Implementing Entity, conservation actions performed or undertaken by Permittees will be eligible to offset development fees if the Permittee satisfies all of the following criteria:

- the conservation action is consistent with the conservation strategy (Chapter 5) or the monitoring and adaptive management program (Chapter 7);
- the conservation action contributes to the biological goals and objectives, the implementation objectives, and would fulfill Plan requirements;
- the conservation action will be completed prior to the date on which development fees are owed; and
- the award of a development fee credit will not hinder the Implementing Entity's ability to satisfy its Stay-Ahead requirement.

For example, a Permittee may conduct portions of the monitoring program that occur in streams under their jurisdiction. In another example, Permittees may provide land management or administrative services to the Implementing Entity, both of which could offset all or a portion of development fees. Conservation actions performed for the Three Creeks HCP to benefit fish covered in that plan may also benefit the covered species in the Habitat Plan and therefore could be credited under both plans.

The monetary value of the credit will be determined by the Implementing Entity on a case-by-case basis. The timing of fee credit will also be determined by the Implementing Entity on a case-by-case basis. In most cases, conservation actions

would need to be performed prior to the covered activity occurring and fee credit being applied (e.g., all aquatic restoration and creation actions would have to occur prior to the construction of the covered activity in order to receive credit toward development fees).

Conservation actions on non-wetland land cover types may be used only to offset land cover fees, not wetland fees. Restoration or creation actions for wetland land cover types can be used only to offset wetland fees, as described below under subheading *Aquatic Restoration or Creation Provided in Lieu of Wetland Fee*.

Permittees that intend to undertake multiple conservation actions may present a package of conservation actions to the Implementing Entity for their approval of credit collectively. Credit provided by conservation actions conducted by a Permittee well in advance of the covered activities may be used by the Permittee to offset fees required for future covered activities.

In quantifying the credit to be awarded for single conservation actions or multiple conservation actions, the Implementing Entity should consider the following:

- the conservation value of the action with respect to Plan implementation requirements, as described based on a standard economic valuation approach related to the Plan fee structure;
- whether the project is located on a site with high resource or restoration values, or has unique or high biological values that support its inclusion in the conservation strategy; and
- whether maintenance and monitoring costs have been identified and are incorporated into cost of the project or otherwise provided according to the requirements of the Plan.

Credits accrued by a Permittee do not have any value beyond covering development fees incurred during Plan implementation. If a Permittee has credits remaining at the conclusion of the permit term, no payment or "refund" will be made to the Permittee. Selling or trading credits between Permittees is not allowed because the funding strategy of the Plan relies on certain contributions of the Permittees beyond their mitigation requirements (see Section 9.4.2 *Local Funding*).

Fee Exempt Projects and Participating Special Entities

Some private projects exempt from the Habitat Plan fees and Habitat Plan ordinance may wish to pay Plan fees or comply with other Plan conditions to facilitate compliance with environmental laws other than the ESA, CESA, or NCCP Act. For example, urban development on a parcel that is less than 0.5 acre that would not affect streams, riparian, wetlands, ponds, or serpentine would be exempt from the Habitat Plan fees. If this parcel supports a small amount of other natural land cover, the project proponents may wish to pay Habitat Plan fees and apply applicable conditions on covered activities in Chapter 6 through their local development approval process to enhance their project for other

purposes (e.g., CEQA)[27]. Fee payment however, does not define a project applicant's need for incidental take coverage under the Plan. In some cases, projects with minor impacts may not be required to pay Habitat Plan development fees. These project proponents would still be required to submit an application package, as defined in Chapter 6 so that quantifiable impacts can be tracked by the Local jurisdiction and Implementing Entity.

For activities performed by a Participating Special Entity (see Section 8.4 *Participating Special Entities*), the Participating Special Entity will pay, at a minimum, the same fees as the Permittees (i.e., applicable development fees) to receive take authorization. The Implementing Entity may require additional fees to cover direct and indirect costs of extending permit coverage under the Habitat Plan, including the costs of Implementing Entity staff time to assist with permit coverage, a portion of the costs of the initial preparation of the Plan, and a portion of the costs of conservation actions designed to contribute to species recovery.

9.4.2 Local Funding

Substantial funds for Plan implementation will come from local sources other than Habitat Plan fees (**Table 9-5**). As described in Chapter 8, land acquisitions and other conservation actions conducted by local organizations can be counted towards the Habitat Plan as long as those conservation actions meet the terms of the Plan. Land acquisition and other conservation actions conducted prior to impacts of the Permittees can be counted towards fee requirements, as described above.

The following local agencies are expected to provide funding that will support the Plan. These local funding sources require that they be used to contribute to the recovery of the covered species (i.e., the NCCP portion of the Plan) or used to mitigate the impacts of their own agency.

Other funding sources may be identified and used during Plan implementation. For example, there may be future ballot measures which could include a funding component for specific elements of Habitat Plan implementation. However, the Local Partners are not expected to, nor are they required to, utilize local general funds for Habitat Plan implementation. Funding shortfalls, and the options available if they occur, are discussed below in Section 9.4.4 *Funding Adequacy*.

County of Santa Clara Parks and Recreation Department

The County of Santa Clara Parks and Recreation Department has been acquiring lands consistently since its founding in 1956.County Parks has a dedicated source of local funding that is used for land acquisition and a majority of their

[27] For the funding analysis, no funding was assumed from exempt projects that choose to opt in to the Habitat Plan.

operations and maintenance budget. The Park Charter Fund was approved by voters in 1972 and has been reauthorized six times since, most recently in 2006, by large margins[28]. Currently, the Fund must be reauthorized by the voters every 12 years; the current fund is authorized through 2021. The Fund is generated by an assessment on property throughout Santa Clara County at 1.425 cents per $100 of assessed value. A minimum of 15% of the Park Charter Fund is earmarked for land acquisition. The County Parks Strategic Plan in 2003 estimated 10-year revenues for land acquisition at over $67 million (County of Santa Clara 2003). As a source of funding, the Park Charter Fund has restrictions for the use of its funds where funds can only be used for "…the acquisition, development or acquisition and development of real property for county park purposes and for the maintenance and operation of county parks." The intended use of the Park Charter Fund for the goals of the Habitat Plan would need to be consistent with County park purposes for public access and recreation[29]. In addition to the provision of park and recreation purposes, the Park Charter funds can be used to contribute to the recovery of the covered species and/or to mitigate for the impacts of County projects. The funds cannot be used to mitigate private development or the covered activities of non-County Permittees.

County Parks is estimated to acquire 5,950 acres of new land that will directly support the Habitat Plan. Actual acquisitions that support the Plan may exceed this estimation. Any acquisitions conducted by County Parks would be owned by the County. All other species and habitat-related management and monitoring would be paid for by the Implementing Entity. The value of 5,950 acres of land acquisition by County Parks is $45,980,000 over the life of the Plan (**Table 9-5**). This value was calculated using an average per acre land value of $7,727, which includes land costs, transaction costs, due diligence, and pre-acquisition surveys (based on total land acquisition costs of $278,940,000 [**Table 9-1]** and 36,100 total acquired acres for the Reserve System). Of the total amount of approximately 5,950 acres, approximately 1,100 acres are interim conservation lands (**Table 5-5**).

The County Parks Strategic Plan estimated spending on land acquisition at approximately $5.6 million per year in 2007 dollars (County of Santa Clara 2003), or $80 million to $120 million over the 10-year horizon of the Strategic Plan. The $46.0 million estimate for the Habitat Plan thus represents a conservative portion of the projected expenditures on land acquisition for the agency as a whole over 50 years.

The value of County Parks land contributions to the Habitat Plan could be used to offset any fees that the County would owe to the Habitat Plan for projects undertaken by the County. County Parks' acquisitions would also be used to contribute to the recovery of the covered species; they cannot mitigate the impacts of non-County projects. Wetland fees will not be offset by land acquisition, and in such cases the respective proponents of County projects would have to cover these wetland fees. Development fees that would be owed by the County excluding wetland fees are estimated at $ 26.7 million ($23.7 million by

[28] For example, in 1996, the Park Charter Fund was reauthorized by 80.2% of the votes in the affirmative.
[29] See Article VI, Section 604 of the Santa Clara County Code.

County Parks and $3.0 million by County Roads and Airports), all of which would be offset by the contribution of land to the Plan by County Parks.

Land Acquisition by Other Local Land Agencies, Non-Profits, and Foundations

To complete the Reserve System, an estimated 10,000 acres must be acquired in addition to the land acquisition expected from County Parks, state and federal funding (described below), and land acquisition funded by development fees. The additional 10,000 acres is also needed from local sources to provide adequate local funding matches for the state and federal grants expected for the Plan. The cost of the additional 10,000 acres is estimated at $77.3 million (**Table 9-5**) based on the same per acre cost used to calculate the estimated value of County Parks land acquisition explained in the prior subsection. The funding for this land acquisition is expected to come from a variety of local land acquisition agencies, non-profit organizations that are dedicated to land acquisition for open space purposes, and local foundations active in this field. Each of these potential sources is described below.

Santa Clara County Open Space Authority

The Open Space Authority currently owns over 15,300 acres of open space in Santa Clara County, approximately 80% in fee title ownership. This agency has been acquiring land since 1995, although most purchases began in 1999.

The Open Space Authority is supported by an assessment district based on property tax assessments in Santa Clara County, San José, Milpitas, Santa Clara, Campbell, and Morgan Hill. The City of Gilroy is not part of the Open Space Authority. To date, the Open Space Authority has spent over $50 million on land acquisition (not in current year dollars) from their benefit assessment district, grants, and gifts.

The purpose of the Open Space Authority is "to preserve key portions of the natural environment in order to balance continuing urban growth." This purpose is consistent with the purposes of the Habitat Plan. The boundary of the Open Space Authority coincides almost exactly with that of the Habitat Plan study area. Because of this geographic alignment and a consistent agency purpose with the Habitat Plan, a majority of future acquisition by the Open Space Authority are expected to be suitable for the Habitat Plan Reserve System.

On September 9, 2010, the Open Space Authority Board of Directors adopted a set of principles of participation in the Habitat Plan. These principles will serve as a basis for a more formal agreement between the Open Space Authority and the Implementing Entity. The principles of participation include commitments to help the Implementing Entity implement the Plan by partnering with them on land acquisition and land management. The Open Space Authority Board has also stated their intent to acquire an estimated 5,000 acres for inclusion in the

Reserve System using their own funds and an additional 2,500 acres for the Reserve System if feasible (e.g., leveraging their own funds with those of others).

The Open Space Authority has also stated their intent to enroll an estimated 1,000 acres of their existing lands into the Reserve System that meets the reserve design requirements and principles of the Plan and to enable enhancement actions funded by the Implementing Entity that will benefit the covered species. If Open Space Authority lands could not be enrolled in the Reserve System because conservation easements are precluded[30] and these lands meet all other criteria for Type 1 or Type 2 open space under the Habitat Plan, then the lands could also count towards the 1,000 acres.

In summary, the Open Space Authority intends to incorporate 5,000 acres of interim lands or lands acquired after permits are issued into the Reserve System and may incorporate an additional 2,500; an estimated 7,500 acres of the 10,000 acres (75%) needed from other local funding sources. In addition, the Open Space Authority intends to enroll up to 1,000 acres of existing lands.

The Open Space Authority also acknowledges their likely role as an agent for land management for Reserve System lands on behalf of the Implementing Entity. The Open Space Authority could serve as a land manager on land that it owns within the Reserve System or on land owned by others within the Reserve System.

The Nature Conservancy

As described in Chapter 2, The Nature Conservancy (TNC) is working to preserve land in and adjacent to the study area through its Mount Hamilton Project, which seeks to protect the most ecologically critical 500,000 acres of this landscape. To date, The Nature Conservancy has permanently protected roughly 110,000 acres in the Mount Hamilton Range through acquisition of conservation easements or fee title to ranches east of U.S. 101. Land acquired in fee title has been transferred to land management agencies such as Henry W. Coe State Park, the CDFG, and the Open Space Authority.

Throughout the planning process, TNC has been an active supporter of the Habitat Plan. They have participated in the Stakeholder Group and provided technical support to the conservation strategy. As a result, many of the conservation goals of the Plan are not only consistent with the conservation goals of the Mount Hamilton Project but with TNC's conservation protocols more broadly. TNC is expected to continue to support the Plan in implementation as a potential land acquisition partner to the Implementing Entity. Where conservation goals overlap, TNC may be able to provide matching funds beyond those identified in this chapter to leverage funds provided by the Implementing Entity. In some instances, TNC may be able to act more quickly to secure land

[30] Interest in land "dedicated for open space purposes" by the Open Space Authority Board cannot be transferred without a vote of the people. This may prohibit conservation easements, which are transfers in land interest.

deals than one of the local public agencies or the Implementing Entity. In these instances, they may act as a land acquisition agent for the Implementing Entity by temporarily holding land until the land can be transferred to a local land management agency like County Parks or the Open Space Authority and added to the Reserve System. In addition, TNC may provide technical assistance to the Implementing Entity during implementation. Although no funding from TNC is identified, TNC would very likely continue to acquire land in the study area, and some of that land is expected to be suitable for the Habitat Plan Reserve System.

Peninsula Open Space Trust

The Peninsula Open Space Trust (POST) is a non-profit land trust that has been actively protecting open space in the Santa Cruz Mountains for over 30 years, including within this Habitat Plan study area. POST is among several strong non-profit conservation leaders in the area covered by the Habitat Plan. Although no funding from POST is identified, POST would likely continue to acquire land in the study area, and some of that land is expected to be suitable for the Habitat Plan Reserve System.

Local Foundations

Local foundations that support open space acquisition and biodiversity planning are expected to play an important role in supporting the Habitat Plan. Foundations such as the Gordon and Betty Moore Foundation (Moore Foundation) and the David and Lucile Packard Foundation (Packard Foundation), which are based in Santa Clara County, have a history of supporting land conservation in the Western United States and are supportive of regional conservation planning in general. The Moore Foundation in particular has expressed support for this Plan acknowledging that the Plan's broad and comprehensive conservation strategy for the region will benefit a wide range of conservation programs and could possibly serve as a model program for others in California. Foundations are expected to continue providing funds beyond those identified in this chapter for land acquisitions within the study area[31], and this Plan may be considered in their funding decision processes.

Interest Income

A small source of income to the Implementing Entity will come from interest on fund balances generated by development fee revenues held prior to expenditure, with a larger amount coming from earnings on the endowment prior to the end of the permit term. The interest estimate for fee revenues held prior to expenditure assumes that the Plan's fund balances will earn an average interest rate of 3.0%. This is consistent with the assumption generally used by the County of Santa

[31] As an example, in 2009 and 2010 the Gordon and Betty Moore Foundation provided two grants totaling $2.38 million to the East Contra Costa County Habitat Conservancy to fund land acquisition for their HCP/NCCP.

Clara Finance Agency when projecting future interest income. Future interest rates are uncertain; however, this assumption is reasonable. The average return rate on the state's Local Agency Investment Fund (LAIF), a statewide investment pool for local agencies, over the 10-year period through fiscal year 2009–2010 was 3.2%, similar to the performance on the County's commingled investment pool.

The Implementing Entity's monetary income from fees is estimated to be approximately $363.7 million over the 50-year permit period (**Table 9-5**), or an average of $7.3 million per year. Local government finance experts indicate that local agencies often hold operating reserve balances equal to approximately 20% of their annual revenue. Thus, it is estimated that the Implementing Entity's average fund balances from fees will be 20% of its annual fee income. (The Plan assumes no interest generated from grant funds due to the typical requirement to spend the land acquisition grants immediately.) Using this assumption, interest income from the Plan's non-grant revenue is estimated to be $2.2 million over the 50-year permit period (**Table 9-5**).

9.4.3 State and Federal Funding

The U.S. Congress and the California Legislature have determined that conserving species and their natural habitats is an issue of both national and state importance. The federal and state governments will strive to assist local governments and property owners to assemble, manage, and monitor the Habitat Plan Reserve System. This assistance will contribute to the land acquisition requirements of the Plan, contribute to recovery of listed species in the study area, and reduce or avoid the need to list additional species as threatened or endangered.

Through this Habitat Plan and the Implementing Agreement with the Permittees, the federal and state governments will endeavor to contribute 14,900 acres of land to the Reserve System that will be administered, managed, and monitored by the Implementing Entity[32]. To be conservative, the Plan assumes that the Implementing Entity will incur the costs of administering, managing, and monitoring these lands. Funding for this land acquisition could come from a variety of sources, including those administered by CDFG and USFWS (**Table 9-13**). Land contributions by USFWS and CDFG could be provided through contributions by the Wildlife Conservation Board. An assessment of progress toward this goal will be made annually and included in the annual report of the Implementing Entity submitted to CDFG and USFWS.

State and federal funding sources other than those administered by CDFG and USFWS (and other than the Wildlife Conservation Board) are also expected to

[32] 14,900 acres = $115 million / $7,727 per acre average land acquisition cost, rounded to the nearest hundred acres. Although this acreage contribution represents 41% of the new land acquired for the Reserve System, this overstates the percentage of the overall effort attributable to State and Federal contribution to the Plan from these funding sources because of Plan costs in addition to land acquisition, e.g., management and monitoring costs.

play an important role in implementing the Habitat Plan. For example, many of the funding sources described in **Table 9-13**, especially sources administered by the California Coastal Conservancy and the California Department of Parks and Recreation, have provided substantial revenues in the past for habitat conservation in the Habitat Plan study area.

If, after the exercise of all available authority and utilization of all available resources, the CDFG and USFWS are unable to contribute 14,900 acres to the Habitat Plan Reserve System, the Implementing Entity, the Permittees, CDFG, and USFWS will reevaluate the Plan and work together to develop a mutually acceptable solution.

Implementation of the Habitat Plan is subject to the federal Anti-Deficiency Act and the availability of appropriated funds. Nothing in this Plan will require the obligation, appropriation, or expenditure of any money from the United States Treasury. USFWS will not be required to expend any federal agency's appropriated funds until an authorized official of that agency commits these funds in writing. Similarly, CDFG will not be required to expend any state agency's appropriated funds until an authorized official of that agency commits these funds in writing. The state and federal agencies will use their best effort to contribute the acreage identified above.

Measuring State and Federal Contributions

State and federal contributions to the Plan are earmarked only for the portion of the Plan that contributes to the recovery of covered species. State and federal contributions cannot be used for the mitigation component of the Plan.

Estimated contributions by the state or federal government must be measured in terms of acreage rather than dollars. To address this, Plan funding source assumptions from **Table 9-5** were converted to acreage based on the overall average cost per acre of reserve land. This calculation assumes that the state and federal agencies will not be acquiring and managing the land themselves (e.g., in a new State Ecological Reserve or National Wildlife Refuge).

The contribution of state and federal funds, which is tracked by acres of land acquired, assumes that the Implementing Entity will administer, manage, and monitor the land itself and pay all of those costs. If the state or federal agency acquires and manages the land, the contribution in acres from the state or federal agency will be adjusted to account for this additional financial contribution. If all costs to restore, enhance, manage, and monitor the land are assumed by the state or federal agency, the $115 million contribution would be the equivalent of 6,424 fully-managed acres[33]. If the state or federal agency assumes some but not all responsibility for management and monitoring then the land acquisition

[33] $115 million / $611 million * 34,153 acres = 6,424 acres. The denominator = $657 million total cost including endowment fund balance at end of permit term, minus the $3 million of plan preparation costs and the $43 million to manage County Parks lands incorporated into the Reserve System.

contribution will be accounted for by mutual agreement between the Wildlife Agencies and the Implementing Entity. As with other partners, all land acquired by state or federal agencies must be managed in accordance with the standards of the Habitat Plan.

If the state and/or federal governments contribute a portion of the costs of a land acquisition, the state and/or federal contribution will be measured as a share of the overall acquired acreage that is in proportion to the state and federal share of the overall costs of the acquisition.

State and Federal Funding Sources

Federal Endangered Species Act Section 6 Program

USFWS's Cooperative Endangered Species Conservation Fund authorized under Section 6 of the ESA[34] is likely to provide a significant source of grant funding for the Habitat Plan. USFWS annually provides significant funds to local jurisdictions developing regional HCPs. The Section 6 grant program is divided into three funding categories: HCP Assistance (for planning), HCP Land Acquisition, and Recovery Land Acquisition Grants. Grants are applied for and administered by CDFG. The Habitat Plan has already received four grants from the HCP Assistance program totaling $1.3 million. During implementation, the Plan will be eligible for HCP Land Acquisition grants.

Since 2002, USFWS has made available, on average, $52.5 million in land acquisition funds nationally. Of this, an average of approximately 44%—nearly $23 million—was dedicated annually for land acquisition for HCPs in California[35]. Since 2002, California has received over $160 million in land acquisition funding for approved HCPs and NCCPs, by far the largest share of any state.

State Funding Sources

As described in **Table 9-13**, there are a variety of sources available for state funding, including existing California propositions (e.g., Proposition 84). Proposition funding for the Habitat Plan can come from a variety of sources including the Wildlife Conservation Board, CalFed Bay-Delta Program, and California Department of Parks and Recreation. More state bond measures for open space preservation and management are expected to be issued as California propositions during the 50-year term of the Plan. For example, Proposition 84 was passed by California voters in the November 2006 General Election by a margin of 53.7%. This bond provides funding for water, park, and natural projects, including $90 million for certain NCCPs, and $108 million for the San

[34] The Fund is commonly referred to as the "Section 6" grant program.
[35] Funding levels to California have held steady for at least eight years. Annual funding to California reached a peak in FY 2007, when 67% of all HCP land acquisition funding went to the state.

Francisco Bay Conservancy Program. Additional bonds similar to Proposition 84 and with approved NCCPs, including the Santa Clara Valley Habitat Plan, are expected to be put forward to the voters several times during the 50-year permit term.

Mitigation and Conservation Components

As discussed in Chapter 1, NCCPs are required to conserve species and their habitats. To achieve this standard, this conservation strategy exceeds typical project mitigation requirements. Although the Plan provides a single conservation strategy to mitigate impacts and conserve covered species, it is important to roughly delineate the mitigation obligations of the Plan from the conservation components because USFWS and CDFG can only fund land acquisition that contributes to the conservation component of the Plan (i.e., they cannot subsidize mitigation).

As described above, development fees were determined, in part, on the basis of mitigation requirements without the Habitat Plan. Preservation ratios were estimated for all terrestrial land cover types based on previously accepted mitigation ratios proposed on a project-by-project basis to offset impacts to occupied habitat for the covered species. Based on these ratios, the overall mitigation component of the Plan is estimated at approximately 56% of the land acquisition (i.e., 56% of the 36,100 acres of new land acquired = 20,216 acres that are administered, managed, and monitored).

This analysis is provided only for convenience to help delineate eligibility for state and federal grant funding for the conservation portion of the Plan. The calculation above cannot be applied as a project mitigation ratio because it was calculated based on the substantial economies of scale available in this Plan (e.g., preserving large blocks of land that support many covered species).

The Habitat Plan is a single plan that must be implemented as a whole. Permits will be issued on the basis of implementation of the entire Plan. The development fees will cover the responsibilities and requirements of the Implementing Entity and participating local jurisdictions to both mitigate their impacts and conserve in the study area. State and federal contributions; continuing local, state, and federal conservation efforts; and funding from private competitive grants can contribute to the conservation component of the Plan.

9.4.4 Funding Adequacy

As shown in **Table 9-5**, funding sources will meet all expected costs of the Habitat Plan. The funding sources described in this chapter have been estimated conservatively. That is, actual funding from local, state, and federal sources may exceed these projections. For example, County Parks may acquire more land than is predicted that would contribute to the Reserve System. Alternatively, additional revenue may be secured from fees on Participating Special Entities.

Temporary impact fees may also exceed projections if many applicants choose to pay all applicable development fees in full rather than try to estimate the frequency of their activities during the permit. Despite these conservative assumptions and additional revenue sources, revenue may fall short of costs. This section further discusses the adequacy of Plan funding.

Additional Funds Needed for Management or Monitoring

The contingency fund is primarily intended to offset land management or monitoring costs that are higher than predicted by this Plan on a short-term basis. If this fund is inadequate to offset these costs, or if costs are predicted to exceed revenue on a long-term basis, then the Implementing Entity will consider whether to adjust management and monitoring requirements without jeopardizing meeting Habitat Plan requirements, or to raise revenue to offset the funding shortfall. When feasible, the Implementing Entity will make reasonable adjustments to revenue to meet the obligations of the Habitat Plan. Some changes may require a minor or major amendment to the Habitat Plan. See Chapter 10 for rules regarding changes to the Habitat Plan.

Actions Required Should Land Acquisitions not Keep Pace with Impacts

The NCCP Act requires that conservation keep pace with development in "rough proportionality." The Stay-Ahead provision of the Plan (see Chapter 8) is intended to ensure that land acquisition and enhancement, restoration, and creation stay within 10% deviation of impacts[36]. Meeting this requirement, however, depends on the steady acquisition of land from willing sellers.

The nature of land acquisition is such that assembly of the Reserve System is not likely to be accomplished in a constant or predictable fashion. It is expected that large (500 acres or more) land acquisitions will comprise the bulk of the total acreage of the Reserve System. Acquisition of large parcels (or combinations of parcels) is typically more complex and may take longer to realize than acquisition of small parcels. Therefore, additions to the Reserve System are expected to be episodic. As a result, the Implementing Entity may be behind in land acquisition relative to impacts for short periods of time while large land acquisition deals are being processed. Over the long term, larger land acquisitions will save money because of their typically lower price per acre and lower per acre land transactions costs.

The Implementing Entity will be responsible for performing the conservation actions necessary to comply with the Stay-Ahead provision, as described in

[36] The 10% deviation allowance does not apply to covered plants. Plant conservation measures will always precede impacts, with the exception of the Coyote ceanothus (Section 5.4.11).

Chapter 8. If the Implementing Entity determines it is at risk of non-compliance with the Stay-Ahead provision for land acquisition (e.g., greater than 10% deviation from the requirements without reasonable land acquisitions in the pipeline), the Implementing Entity may notify the other Permittees that it is necessary to temporarily require project proponents to provide land instead of paying a fee, unless the Permittee has previously accrued sufficient credits to offset any fee otherwise due. If the Stay-Ahead provision is not satisfied for land acquisition for any land cover type based on the criteria in Section 8.6.1 *Stay-Ahead Provision* of Chapter 8, the Implementing Entity must notify the other Permittees that it is necessary to temporarily require project proponents to provide land instead of paying a fee unless the Wildlife Agencies agree, after conferring with the Implementing Entity, that a different plan of action devised with the Implementing Entity will remedy the situation and it is not necessary to require project proponents to provide land instead of paying a fee. If the Implementing Entity determines that it is at risk of non-compliance with the Stay-Ahead provision for other components of the conservation strategy besides land acquisition (e.g., habitat restoration), the Implementing Entity will confer with the Wildlife Agencies immediately to determine the best course of action.

If the Implementing Entity initiated the requirement due to its own determination that the Plan was at risk of non-compliance, the requirement to provide land instead of a fee will be lifted (i.e., it will revert back to an option) as soon as the Implementing Entity determines that it is no longer at risk of non-compliance with the Stay-Ahead provision. If the requirement is imposed by the Wildlife Agencies as a result of non-compliance with the Stay-Ahead provision, the requirement will be lifted as soon as the Implementing Entity demonstrates in writing to the reasonable satisfaction of the Wildlife Agencies that the Plan is in compliance with the Stay-Ahead provision.

Actions Required Should Development Fee Funding Fall Short of Expectations

This chapter describes the funding expected from development fees from the implementation of covered activities by public agencies (the Permittees) and private developers. These estimates are based on long-term projections of development based on historic patterns and the approval planning documents of local jurisdictions. The pace of development has slowed considerably in the study area as a result of the 2008–2009 economic recession. As a result, the pace of development is not expected to reach pre-2008 levels for many years. Revenue from covered activities during the first 5 to 10 years of implementation may fall short of expectations.

Revenue from non-fee funding sources could offset the shortfall in fee funding in the short term, providing enough funding for land acquisition early in the Plan. However, most non-fee funding cannot be used for land management, monitoring, or administrative costs associated with the Reserve System. These costs are dependent on fee funding. In the short term, if fee funding cannot keep pace with the operations and management needs of the Reserve System, the

Implementing Entity will consider the following options in consultation with the Wildlife Agencies:

- Continued acquisition of land from willing sellers for the Reserve System to take advantage of lower land costs but deferral of non-essential management and monitoring of these lands for up to 5 years or when development fee revenue is sufficient, whichever comes first (see below for additional details on this option).
- Identifying new funding sources that will cover the costs of operations and maintenance of the Reserve System until fee revenue increases to offset these costs over the long term.
- With the approval of the Wildlife Agencies, defer implementation tasks that are not critical for compliance with the permits, IA, and Habitat Plan, some of which are included in **Table 8-1**.
- Other options that meet the biological goals and objectives of the Plan and are consistent with the permits, IA, and Plan.

As described in Chapter 5, if development fee funding falls short of expectations but the Reserve System is expanding as fast or faster than it should to meet the Stay Ahead requirement, the Implementing Entity may defer management of these lands until development fee funding (or other sources) are available. Specifically, if needed the Implementing Entity may limit management to essential management tasks and defer non-essential management tasks for up to 5 years from the purchase of the first parcel of each reserve unit, or when development fees become available, whichever comes first. Essential management tasks are defined as those tasks necessary to ensure that the condition of the reserve unit does not degrade below the existing condition at the time it was incorporated into the Reserve System in terms of natural land cover and covered species habitat. Existing conditions will be documented by the Implementing Entity through the pre-acquisition assessment and the site inventory, described in Chapters 7 and 8. Management in response to changed circumstances (i.e., remedial actions described in Chapter 10) cannot be deferred.

Over the entire permit term, fee revenue may also fall short of expectations if fewer covered activities occur than assumed under the Plan. Although unlikely, this shortfall will make it difficult for the Permittees to meet their conservation obligations. If it appears that take authorized under the permits will fall short of expectations, substantially reducing fee revenue, the Implementing Entity and other Permittees will work with the Wildlife Agencies to extend the term of the permits to allow the use of the authorized take and allow full implementation of the Plan. As described above, the Local Partners are not expected to, nor are they required to, utilize local general funds for Habitat Plan implementation in the event of funding shortfalls as a result of less fee revenue than expected, either in the short term or the long term.

Alternatively, if revenues fall far short of expectations and it is unlikely that the Permittees will meet their permit obligations they may apply to reduce the authorized take and reduce the permit obligations. Any permit term extension or

request for reductions in Plan obligations will follow the requirements for a major amendment described in Chapter 10.

Actions Required Should Non-Fee Funding Fall Short of Expectations

This chapter describes the non-fee funding sources that are being committed or are expected to be provided by local, state, and federal agencies (see Sections 9.4.2 *Local Funding* and 9.4.3 *State and Federal Funding*). These commitments and expectations are based on conservative assumptions and a track record of providing similar funding locally or to other HCPs and NCCPs in northern California. Despite these assumptions, it is possible that these non-fee funding sources will fall short of expectations. These local sources are intended to contribute to conservation actions (i.e., not mitigation). If these funding sources fall short, then the Implementing Entity may have difficulty meeting its obligation to provide for the conservation of some of the covered species.

In the event of shortfalls in non-fee funding, the Implementing Entity will make reasonable adjustments to expenditures to meet the obligations of the Habitat Plan. If these adjustments are inadequate to address the shortfall, the Implementing Entity will consult with the Wildlife Agencies regarding the best course of action. As described above, the Local Partners are not expected to, nor are they required to, utilize local general funds for Habitat Plan implementation in the event of funding shortfalls as a result of less non-fee revenue than expected. Actions considered will include reducing take authorization and conservation obligations in proportion to the funding shortfall. Such reductions would need to follow the major amendment process described in Chapter 10.

Funding for Post-Permit Management and Monitoring

After the permit term, all of the Permittees are obligated to continue to protect, manage, and maintain the Reserve System[37]. This includes adaptive management and monitoring at a level sufficient to determine whether management is effective. Other obligations, however, disappear after the permit term. For example, the Permittees are no longer obligated to annually report the status of the Plan to the Wildlife Agencies. Three to 5 years prior to the termination of the permit, the Permittees will determine how to handle the continuing obligations of the Implementing Entity with the approval of the Wildlife Agencies. Preservation, enhancement, restoration, and creation obligations will also be completed prior to the end of the permit term and will not continue post-permit. Remedial measures and contingency also no longer need to be funded after the permit term.

[37] The Implementing Entity may or may not exist after the permit term. Regardless, all Permittees have the obligation to maintain the Reserve System after the permit term.

Detailed assumptions regarding post-permit costs are presented in **Appendix G**. Annual costs to operate and maintain the Reserve System in perpetuity are estimated to be approximately 64% of the annual cost for program administration estimated during Years 46–50, 80% of reserve management and maintenance costs, and 34% of monitoring costs (**Table 9-4**). Total post-permit costs are estimated to be approximately $2.9 million annually. Actual long-term costs may be lower if the Implementing Entity can develop streamlined procedures for management and monitoring during the permit term or reduce administrative costs. Responsibility for funding long-term management and monitoring rests solely with the Permittees.

Funding provided by interest on the endowment is expected to fully fund post-permit costs. Any shortfalls in the endowment during the permit term will be identified by the 5-year funding assessments conducted by the Implementing Entity. If the endowment is not growing fast enough to reach its target size, then the endowment fee portion of the development fees will be increased to make up the shortfall. With these built-in safeguards in the endowment, post-permit funding is expected to be adequate to fully offset post-permit costs of management and monitoring.

Table 9-1. Summary of Habitat Plan Implementation Cost Estimate

Final Plan

2010 dollars

Total Budget (rounded to the nearest ten thousand)

	Total Cost per Implementation Period (Years)												
Budget Category	0	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	**Total**	**Annual Average**
Land Acquisition	$3,730,000	$27,380,000	$31,020,000	$31,020,000	$31,020,000	$31,020,000	$31,020,000	$31,020,000	$31,020,000	$30,690,000	$0	$278,940,000	$5,580,000
Reserve Management and Maintenance	$0	$3,750,000	$8,580,000	$8,920,000	$10,140,000	$9,940,000	$10,920,000	$10,720,000	$10,660,000	$10,990,000	$10,740,000	$95,360,000	$1,910,000
Monitoring, Research, and Scientific Review	$0	$2,140,000	$2,180,000	$2,600,000	$2,410,000	$2,810,000	$2,960,000	$3,350,000	$3,600,000	$4,040,000	$4,140,000	$30,230,000	$600,000
Western Burrowing Owl Conservation Strategy	$0	$320,000	$700,000	$580,000	$810,000	$770,000	$1,020,000	$920,000	$1,210,000	$1,100,000	$1,140,000	$8,570,000	$170,000
Habitat Restoration/Creation	$0	$10,420,000	$10,750,000	$11,000,000	$11,230,000	$11,330,000	$11,390,000	$11,490,000	$11,340,000	$1,850,000	$1,830,000	$92,630,000	$1,850,000
Program Administration	$330,000	$3,740,000	$3,980,000	$4,220,000	$4,350,000	$4,590,000	$4,650,000	$4,800,000	$4,970,000	$5,170,000	$5,090,000	$45,890,000	$920,000
Contingency Fund	$110,000	$1,010,000	$1,280,000	$1,300,000	$1,330,000	$1,340,000	$1,380,000	$1,380,000	$1,400,000	$1,410,000	$480,000	$12,420,000	$250,000
Total	$4,170,000	$48,760,000	$58,490,000	$59,640,000	$61,290,000	$61,800,000	$63,340,000	$63,680,000	$64,200,000	$55,250,000	$23,420,000	$564,040,000	$11,280,000

Capital Budget (rounded to the nearest ten thousand)

	Total Cost per Implementation Period (Years)												
Budget Category	0	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	**Total**	**Annual Average**
Land Acquisition: acquisition and site improvements	$3,600,000	$26,320,000	$29,880,000	$29,880,000	$29,880,000	$29,880,000	$29,880,000	$29,880,000	$29,880,000	$29,560,000	$0	$268,640,000	$5,370,000
Reserve Management and Maintenance: vehicles, equipment, and facilities	$0	$1,510,000	$1,520,000	$1,630,000	$2,310,000	$1,840,000	$2,490,000	$2,020,000	$2,060,000	$2,150,000	$1,900,000	$19,430,000	$390,000
Monitoring & Research: equipment and vehicles	$0	$10,000	$10,000	$20,000	$10,000	$20,000	$10,000	$20,000	$10,000	$20,000	$10,000	$140,000	$3,000
Western Burrowing Owl Conservation Strategy	$0	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$100,000	$2,000
Habitat Restoration/Creation: construction, office equipment, and vehicles	$0	$9,400,000	$9,400,000	$9,420,000	$9,410,000	$9,430,000	$9,410,000	$9,430,000	$9,420,000	$50,000	$30,000	$75,400,000	$1,510,000
Program Administration: equipment purchases	$20,000	$80,000	$50,000	$70,000	$50,000	$90,000	$50,000	$70,000	$50,000	$90,000	$50,000	$670,000	$10,000
Contingency, land acquisition and site improvements	$110,000	$790,000	$900,000	$900,000	$900,000	$900,000	$900,000	$900,000	$900,000	$890,000	$0	$8,090,000	$160,000
Total	$3,730,000	$38,120,000	$41,770,000	$41,930,000	$42,570,000	$42,170,000	$42,750,000	$42,330,000	$42,330,000	$32,770,000	$2,000,000	$372,470,000	$7,445,000
											Land acquisition cost per acre acquired	**$7,400**	
											Restoration cost per acre restored (not including stream restoration)	**$81,000**	

Operational Budget (rounded to the nearest ten thousand)

	Total Cost per Implementation Period (Years)												
Budget Category	0	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	**Total**	**Annual Average**
Land Acquisition: transaction costs	$130,000	$1,070,000	$1,140,000	$1,140,000	$1,140,000	$1,140,000	$1,140,000	$1,140,000	$1,140,000	$1,140,000	$0	$10,320,000	$210,000
Reserve Management and Maintenance: facility, vehicle, and equipment maintenance and personnel	$0	$2,240,000	$7,060,000	$7,290,000	$7,830,000	$8,100,000	$8,440,000	$8,700,000	$8,610,000	$8,840,000	$8,840,000	$75,950,000	$1,520,000
Monitoring, Research, and Scientific Review	$0	$2,130,000	$2,170,000	$2,580,000	$2,400,000	$2,790,000	$2,950,000	$3,330,000	$3,600,000	$4,020,000	$4,140,000	$30,110,000	$600,000
Western Burrowing Owl Conservation Strategy	$0	$300,000	$690,000	$580,000	$790,000	$760,000	$1,010,000	$910,000	$1,200,000	$1,100,000	$1,130,000	$8,470,000	$170,000
Habitat Restoration/Creation: vehicle maintenance and personnel, long-term management/monitoring	$0	$1,020,000	$1,350,000	$1,580,000	$1,820,000	$1,900,000	$1,980,000	$2,060,000	$1,930,000	$1,800,000	$1,800,000	$17,240,000	$340,000
Program Administration: personnel, legal and financial assistance, insurance, ED's discretionary budget, in-lieu funding	$310,000	$3,660,000	$3,930,000	$4,150,000	$4,300,000	$4,490,000	$4,600,000	$4,730,000	$4,920,000	$5,080,000	$5,040,000	$45,210,000	$900,000
Operating Contingency Fund	$0	$220,000	$380,000	$400,000	$440,000	$440,000	$480,000	$490,000	$500,000	$520,000	$480,000	$4,350,000	$90,000
Total	$440,000	$10,640,000	$16,720,000	$17,720,000	$18,720,000	$19,620,000	$20,600,000	$21,360,000	$21,900,000	$22,500,000	$21,430,000	$191,650,000	$3,830,000
Average Annual Cost per Acre Managed, New Reserve System		**$553**	**$329**	**$237**	**$191**	**$162**	**$144**	**$129**	**$116**	**$107**	**$101**		
Average Annual Cost per Acre Managed, Existing Open Space		**$2**	**$71**	**$71**	**$71**	**$71**	**$71**	**$71**	**$71**	**$71**	**$72**		

Notes:
Detail may not add to total due to rounding at various stages of the calculations.

Table 9-2. Santa Clara Valley Habitat Plan Reserve System Summary

	Acres
Permanent Impact [1]	17,975
New Acquisition for the Reserve System	
Mitigation[2]	20,112
Enhancement	15,988
Subtotal[3]	*36,100*
Existing Open Space Contributed to the Reserve System[4]	
County of Santa Clara Parks and Recreation Department	12,291
Santa Clara County Open Space Authority	1,000
Subtotal	*13,291*
Total Estimated Minimum Size of the Reserve System[5]	**49,391**

[1] See **Table 4-2**.

[2] See *Development Fee Nexus Study* for calculation of mitigation requirement for Reserve System.

[3] Includes 1,100 acres of interim conservation lands (acquisition between signing of the 2007 Planning Agreement and issuance of Plan permits) by County Parks (see **Table 5-5)**. To the extent that these are non-wetland land covers this land could be mitigation in lieu of the County's development fee obligation for County covered activities (not private development). Otherwise these lands would apply to the enhancement component of the Reserve System.

[4] See **Table 5-5.**

[5] The total size of the Reserve System will be at least 46,496 acres and up to an estimated 46,920 acres. The acreage 49,391 is a sum of acres of assumed acquired lands plus existing open space. The assumption for acquired acres is based on a hypothetical Reserve System design that meets all of the minimum acquisition requirements as described in **Table 5-13**.

Table 9-3. Summary of Annual Management and Monitoring Costs per Acre

2010 dollars

Total Budget (rounded to the nearest ten thousand)

Budget Category	0	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
Reserve Management and Maintenance	$0	$800,000	$1,840,000	$1,880,000	$2,180,000	$2,130,000	$2,380,000	$2,330,000	$2,370,000	$2,420,000	$2,370,000
Total Reserve Management Cost	$0	$800,000	$1,840,000	$1,880,000	$2,180,000	$2,130,000	$2,380,000	$2,330,000	$2,370,000	$2,420,000	$2,370,000
Total Reserve Management Cost Per Acre on Land Acquired	na	$211	$127	$88	$86	$66	$66	$55	$49	$45	$44
Total Reserve Management Cost Per Acre on Existing Open Space	na	$0	$66	$66	$66	$66	$66	$66	$66	$66	$66
Monitoring, Research, and Scientific Review	$0	$460,000	$490,000	$580,000	$550,000	$650,000	$700,000	$780,000	$850,000	$940,000	$960,000
Total Monitoring Cost Per Acre on Land Acquired	na	$113	$56	$45	$32	$31	$28	$27	$26	$25	$26
Total Monitoring Cost Per Acre on Existing Open Space	na	$2	$5	$5	$5	$5	$5	$5	$5	$5	$6
Land Acquired and Managed for Reserve System	-	3,795	7,590	11,384	15,179	18,974	22,769	26,563	30,358	34,153	34,153
Existing Open Space Managed for Reserve System	-	13,291	13,291	13,291	13,291	13,291	13,291	13,291	13,291	13,291	13,291
Total Reserve Acres	**-**	**17,086**	**20,881**	**24,675**	**28,470**	**32,265**	**36,060**	**39,854**	**43,649**	**47,444**	**47,444**

Assumptions / Notes:

Management activities on existing open space begin in year 6.

Monitoring activities on existing open space begin in year 3.

Detail may not add to total due to rounding at various stages of the calculations.

Table 9-4. Summary of Habitat Plan Budget After Permit Term

	Avg. Annual Cost After Permit Term[1]		Post-Permit Budget as a Percent of Year 46-50 Annual Costs
Total Budget	All Reserve Lands	Restored Wetlands	
Land Acquisition	$0	$0	--
Reserve Management and Maintenance	$1,710,000	$36,000	81%
Monitoring, Research, and Scientific Review	$280,000	$27,000	37%
Western Burrowing Owl Conservation Strategy	$230,000	$0	100%
Habitat Restoration/Creation	$0	$0	0%
Program Administration	$650,000	$0	64%
Contingency Fund	$0	$0	0%
Total	**$2,870,000**	**$63,000**	**63%**
Capital Budget			
Land Acquisition: acquisition and site improvements	$0	$0	--
Reserve Management and Maintenance: vehicles, equipment, and facilities	$120,000	$0	32%
Monitoring & Research: equipment and vehicles	$600	$0	30%
Western Burrowing Owl Conservation Strategy	$2,000	$0	100%
Habitat Restoration/Creation: construction, office equipment, and vehicles	$0	$0	0%
Program Administration: equipment purchases	$10,000	$0	100%
Contingency, land acquisition and site improvements	$0	$0	0%
Total	**$132,600**	**$0**	**33%**
Operational Budget			
Land Acquisition: transaction costs	$0	$0	--
Reserve Management and Maintenance: facility, vehicle, and equipment maintenance and personnel	$1,590,000	$36,000	92%
Monitoring, Research, and Scientific Review	$280,000	$27,000	37%
Western Burrowing Owl Conservation Strategy	$230,000	$0	100%
Habitat Restoration/Creation: vehicle maintenance and personnel	$0	$0	0%
Program Administration: personnel, legal and financial assistance, insurance, ED's discretionary budget, in-lieu funding	$640,000	$0	63%
Operating Contingency Fund	$0	$0	0%
Total	**$2,740,000**	**$63,000**	**65%**
Land Acquired and Managed for Reserve System[2]	34,153		
Existing Open Space Managed for Reserve System	13,291		
Total Acres Managed / Wetlands Restored	**47,444**	**506**	
Average Annual Cost per Acre Managed, New Reserve System	$50	$120	
Average Annual Cost per Acre Managed, Existing Open Space	$70		

Notes:

Detail may not add to total due to rounding at various stages of the calculations.

[1] For details on the assumptions for these calculations, see the Cost Model in Appendix G, sheets "9-4 SummaryPostPermitBudget" and "G-9 Assumptions_PostPermit."

[2] Includes the total acres of preserved and restored or created land cover types that will be managed in perpetuity.

Table 9-5. Funding Sources

Funding Source		Final Plan Amount	% of Funding	Source
Development Fees				
Land Cover and Nitrogen Deposition Fees				
Private Development (all jurisdictions)	$	163,440,000	25%	Local
County of Santa Clara[1]	$	-	0%	Local
City of San Jose	$	2,000,000	0%	Local
City of Gilroy	$	80,000	0%	Local
City of Morgan Hill	$	290,000	0%	Local
Santa Clara Valley Water District	$	8,090,000	1%	Local
Santa Clara Valley Transportation Agency	$	1,560,000	0%	Local
Serpentine Fee[1]	$	29,270,000	4%	Local
Wetland Fee (private development and public agencies)	$	77,600,000	12%	Local
Burrowing Owl Fee	$	8,830,000	1%	Local
Temporary Impact Fees (all public agencies)	$	16,010,000	2%	Local
Endowment Fee Component	$	36,500,000	6%	Local
Plan Preparation Fee Component[2]	$	3,010,000	0%	Local
Participating Special Entity Fees	$	17,000,000	3%	Local
Total Fee Funding	$	363,680,000	55%	
Non-Fee Funding				
Other Local Funding				
County of Santa Clara Parks and Recreation Land Acquisition[1,3]	$	45,980,000	7%	Mixed[7]
Land Acquisition by Local Land Agencies, Non-Profits, and Foundations[3,4]	$	77,270,000	12%	Mixed[7]
Interest Income on Permit Period Funding[5]	$	2,180,000	0%	Local
Endowment Investment Income[6]	$	53,640,000	8%	Local
Total Other Local Funds	$	179,070,000	27%	
State and Federal Funding				
New Wildlife Agency Funds (Section 6, etc.)	$	115,000,000	17%	Mixed
Total Non-Fee Funding	$	294,070,000	45%	
Total Funding and Plan Costs				
Total Funding	$	657,750,000	100%	
Plan Implementation Budget (excl. Plan Preparation and Endowment)	$	564,040,000		
Plan Preparation Costs	$	3,010,000		
Endowment Balance at End of Permit Period	$	90,140,000		
Total Cost of Plan and Endowment	$	657,190,000		
Surplus / (Deficit)	$	560,000		

[1] Development fees except for permanent and temporary wetland mitigation fees for County of Santa Clara covered activities (County Parks and County Roads and Airports) are excluded because fees would be more than offset by County Parks acquisition of land for Reserve System (estimated at 5,950 acres).

[2] Net plan preparation costs were reduced by 20% to exclude estimated costs associated with recovery and limit costs for the purposes of the development fee to mitigation-related planning only.

[3] Acquisition costs based on average per acre costs for Plan including transaction costs.

[4] Cost of land to be provided agencies and organizations that acquire and preserve land in Santa Clara County (estimated at 10,000 acres) such as the Santa Clara County Open Space Authority, the Peninsula Open Space Trust, The Nature Conservancy, The Silicon Valley Land Conservancy, David and Lucille Packard Foundation, the Gordon and Betty Moore Foundation, and others.

[5] Estimated interest earned on permit term operating fund balances generated by development fees. Based on 3% annual interest (recommended by County of Santa Clara Finance Department) applied to a fund balance estimated to equal 20% of average annual total development fee revenue.

[6] Based on an assumed real interest rate of 3.25% over inflation applied to endowment fee revenue, consistent with projected returns on long-term endowment investment funds held for the California Department of Fish and Game by the National Fish and Wildlife Foundation.

[7] Funding sources may be a mix of local sources, state grants, and federal grants from agencies such as the California Coastal Conservancy and State Wildlife Conservation Board.

Table 9-6. Land Cover Development Fees

Development Fee Type[1,2]	Unit	Projected Initial Fee Amount[3]	Alternative Payment Mechanisms[4]
Land Cover Fee			
Zone A: Mostly natural lands	per acre	$ 15,416	Land in lieu; mitigation bank credit
Zone B: Mostly agricultural and valley floor rural residential lands	per acre	$ 10,688	Land in lieu; mitigation bank credit
Zone C: Small vacant sites between 0.5 and 10 acres surrounded by urban development	per acre	$ 3,905	Land in lieu; mitigation bank credit
Serpentine Fee	per acre	$ 50,166	Land in lieu (must be serpentine)
Nitrogen Deposition Fee	per new vehicle trip	$ 3.60	Other mechanism determined during implementation
Burrowing Owl Fee	per acre	$ 50,438	Land in lieu (must be occupied nesting habitat)
Wetland Fee			
Willow Riparian Forest and Mixed Riparian	per acre	$ 139,708	Wetland mitigation in lieu; mitigation bank credit
Central California Sycamore Woodland	per acre	$ 255,182	Wetland mitigation in lieu; mitigation bank credit
Freshwater Marsh	per acre	$ 171,322	Wetland mitigation in lieu; mitigation bank credit
Seasonal Wetlands	per acre	$ 374,842	Wetland mitigation in lieu; mitigation bank credit
Pond	per acre	$ 153,321	Wetland mitigation in lieu; mitigation bank credit
Stream	per linear ft.	$ 588	Wetland mitigation in lieu; mitigation bank credit
Temporary Impact Fee			
Land Cover	per acre	Varies[5]	Land in lieu; mitigation bank credit
Serpentine	per acre	Varies[5]	Land in lieu (must be serpentine)
Burrowing Owl	per acre	Varies[5]	Land in lieu (must be occupied nesting habitat)
Wetland	per acre	Varies[5]	Wetland mitigation in lieu; mitigation bank credit

[1] See Chapter 9 for details of each development fee and in what circumstances it is required.

[2] The Endowment fee and Plan Preparation fee are included in the appropriate Habitat Plan fees listed in this table as described in Chapter 9.

[3] Projected initial fees would apply only in the first year of Plan implementation. All development fees would be adjusted (up or down) on an annual basis by a date determined by the Implementing Entity's Governing Board within the first 6 months of Plan implementation.

[4] All fees may be paid in cash or, at the discretion of the Implementing Entity, through implementation of conservation actions.

[5] Temporary fee varies based on duration of impact. See Chapter 9 text for details.

Table 9-7a. Habitat Plan Land Cover Development Fees and Estimated Revenue

Item	Fee Zone[1] Zone A: Mostly Natural Lands	Zone B: Mostly Agricultural and Rural Residential Lands	Zone C: Small Vacant Sites	Serpentine Fee [2]	Total
Land Cover Fee at Start of Permit Term[3]	$13,630 per acre	$9,450 per acre	$3,453 per acre	$44,355 per acre	
Endowment Fee Component at Start of Permit Term[3]	$1,595	$1,106	$404	$5,190	
Plan Preparation Cost Recovery Fee Component at Start of Permit Term[3]	$191	$132	$48	$621	
Total Fee per Acre	$15,416	$10,688	$3,905	$50,166	
Estimated Approximate Cost per Housing Unit in Cities[4]	$3,854	$2,672	$976	$16,396	
Estimated Approximate Cost per Housing Unit in County (Low/High)[5]	$7,708 / $46,248	$5,344 / $32,064	Not applicable	$32,791 / $196,746	
Estimated Acres of Impact in Fee Zones (Zone A, B, and C) over the Permit Term[6]	5,670 acres	11,400 acres	600 acres	675 acres	17,670 acres[7]
Estimated Land Cover Fee Revenue[8,9] (2010 dollars) over the Permit Term	$59,320,000	$104,470,000	$1,550,000	$29,270,000	$194,610,000

Notes:

1 As defined in **Figure 9-1** and in Chapter 9. Zone names are provided only as a general guide to dominant land cover (**Figure 9-2**). The nitrogen deposition fee is also assessed in every zone for applicable covered activities.

2 Serpentine fee will be charged in addition to the base land cover fee for the zone where the project is located for any impacts in serpentine land cover types (serpentine bunchgrass grassland, serpentine chaparral, serpentine seep, and serpentine rock outcrop). Serpentine land cover types primarily occur in Zone A.

3 See *Development Fee Nexus Study* for fee calculation methods. All fees will be adjusted for inflation or deflation according to **Table 9-12** and the terms of the Habitat Plan; consult planning staff with your participating jurisdiction for the latest Habitat Plan fees.

4 Assumes average housing density of 4.0 units per acre for Zone A, B, and C. This is an estimate only; fees will be charged on a per acre basis, not on a per unit basis.

5 Low estimate assumed a 0.5 acre lot; fee paid on entire parcel. High estimate assumes 3.0 acres of development envelope on a parcel size of 10 acres or more; fee paid on the size of the development envelope.

6 Excludes impacts associated with conservation strategy implementation. Implementation of the conservation strategy is expected to have net benefits for covered species and the Implementing Entity will not pay fees to itself for its impacts.

7 Zone A, B and C impacts. Serpentine land cover impacts are already included in this total for Zone A.

8 Estimated revenue does take into account credit that might be applied to public agencies that owe development fees but also contribute funding for conservation (e.g., County Parks). See text for details.

8 Does not include projected revenue from endowment and plan preparation fee components that are shown separately in **Table 9-5**.

Table 9-7b. Habitat Plan Nitrogen Deposition Fee and Estimated Revenue

Item	Amount
Nitrogen Deposition Fee per New Daily Vehicle Trip at Start of Permit Term (applied in all Fee Zones) [1]	$3.19
Endowment Fee per New Daily Vehicle Trip at Start of Permit Term (applied in all Fee Zones)	$0.37
Plan Preparation Fee per New Daily Vehicle Trip at Start of Permit Term (applied in all Fee Zones)	$0.04
Total Fees Charged per New Daily Vehicle Trip	$3.60
Plan Area Average Daily Trip Growth During Permit Term[2]	3,176,000
Projected Nitrogen Deposition Fee Revenue (2010 dollars)[3]	$10,120,000
Approximate Cost per Single Family Housing Unit[4]	$34

Notes:

[1] See text and **Table 9-10** for fee calculation methods. All fees will be adjusted for inflation or deflation according to **Table 9-12** and the terms of the Habitat Plan; consult planning staff with your participating jurisdiction for the latest Habitat Plan fees.

[2] Estimate only; fees will be charged based on new average daily vehicle trips.

[3] Does not include revenue from endowment and plan preparation fee components that are shown separately in **Table 9-5**.

[4] Assumes 9.57 average daily trips per single family housing unit.

Table 9-8. Endowment Fee Calculations

	All Reserve Lands	Restored Wetland Only
Annual Endowment Fund Revenue Needed During Permit Term (2010$)	$ 720,000	$ 10,000
Permit Term (years)	50	50
Endowment Fee Revenue Needed During Permit Term (rounded)	$ 36,000,000	$ 500,000
Total Projected Development Fee Revenue[1]	$ 307,170,000	$ 91,550,000
Endowment Cost Factor	0.117	0.005
Endowment Cost Factor for All Reserve Lands Excluding Restored Wetland		0.117
Endowment Cost Factor for Restored Wetland		0.122

Fee Category	Base Fee Amount	Endowment Cost Factor	Fee Component
Land Cover Fees (per acre)			
Zone A	$ 13,630	0.117	$ 1,595
Zone B	9,450	0.117	1,106
Zone C	3,453	0.117	404
Serpentine Fee (per acre)	$ 44,355	0.117	$ 5,190
Nitrogen Deposition Fee (per vehicle trip)	$ 3.19	0.117	$ 0.37
Burrowing Owl Fee (per acre)	$ 44,596	0.117	$ 5,218
Wetland Fee (per acre, per foot for streams)			
Willow Riparian Forest and Scrub	$ 122,982	0.122	$ 15,004
Central California Sycamore Alluvial Woodland	224,632	0.122	27,405
Mixed Riparian Forest and Woodland	122,982	0.122	15,004
Coastal and Valley Freshwater Marsh	150,812	0.122	18,399
Seasonal Wetland	329,966	0.122	40,256
Pond	134,965	0.122	16,466
Streams	518	0.122	63
Temporary Fee (per acre)			
Land Cover	Varies[2]	0.117	Varies[2]
Wetland	Varies[2]	0.117	Varies[2]

[1] Includes projected fee revenue for permanent and temporary land cover and wetland mitigation, nitrogen deposition, serpentine, and burrowing owl.

[2] Applicable base fee adjusted for duration of impact.

Table 9-9. Plan Preparation Cost Recovery Fee Calculations

Plan Preparation Costs	$	6,350,000
Less: Section 6 Grant		1,107,648
Plan Preparation Costs Funded by Local Partners	$	5,242,352
Mitigation Share of Plan Preparation Cost[1]		80%
Mitigation-Related Plan Preparation Cost	$	4,190,000
Total Projected Development Fee Obligation[2]	$	307,170,000
Plan Preparation Cost Factor		0.014

Fee Category		Base Fee Amount	Plan Preparation Cost Factor		Fee Component
Land Cover Fees (per acre)					
Zone A	$	13,630	0.014	$	191
Zone B		9,450	0.014		132
Zone C		3,453	0.014		48
Serpentine Fee (per acre)	$	44,355	0.014	$	621
Nitrogen Deposition Fee (per vehicle trip)	$	3.19	0.014	$	0.04
Wetland Fees (per acre)					
Willow Riparian Forest/Mixed Riparian	$	122,982	0.014	$	1,722
Central Calif. Sycamore Woodland		224,632	0.014		3,145
Freshwater Marsh		150,812	0.014		2,111
Seasonal Wetland		329,966	0.014		4,620
Pond		134,965	0.014		1,890
Streams (per linear foot)		518	0.014		7
Burrowing Owl Fee (per acre)	$	44,596	0.014	$	624

[1] Based on an estimate that preparing an HCP-only Plan would cost approximately 80% of the costs incurred to prepare the Habitat Plan.

[2] Includes land cover, serpentine, nitrogen deposition, wetland mitigation, burrowing owl and temporary development fees.

Table 9-10. Habitat Plan Nitrogen Deposition Fee Calculation

Serpentine Management & Monitoring Cost Mitigation Related to Nitrogen Deposition[1]	$	5,310,000
Other Mitigation Costs Related to Nitrogen Deposition[2]		14,930,000
Total Mitigation Costs Related to Nitrogen Deposition	$	20,240,000
Share of Nitrogen Deposition from Plan Area[3]		50%
Plan Area Share of Nitrogen Deposition Mitigation Costs	$	10,120,000
Plan Area Vehicle Trip Growth		3,176,000
Nitrogen Deposition Fee per New Vehicle Trip	**$**	**3.19**

[1] Additional per-acre management and monitoring costs for serpentine land covers estimated at $2,148 ($4,360 total serpentine costs minus $2,212 average cost for other land covers). An estimated 2,704 acres of serpentine land in the Reserve System is for mitigation based on estimated serpentine land cover impacts and a 4:1 mitigation ratio. Total additional management and monitoring costs for serpentine mitigation lands in the reserve is $5.81 million ($2,148 x 2,704).

[2] Includes 20% of mitigation costs for land covers known to be sensitive to nitrogen deposition, and 10% of mitigation costs for land covers that may be sensitive to nitrogen deposition. See *Development Fee Nexus Study* for more details.

[3] Based on calculations in **Appendix E**.

Table 9-11. Wetland Fees by Land Cover Type

Land Cover Type	Total per Unit Cost[1]	Required Compensation Ratio for Restoration/ Creation[2]	Restoration Fee per Unit of Impact[3]	Endowment Component[4]	Plan Preparation Component[5]	Total Fee	Method for Determining Fee Boundary
Willow and mixed riparian forest, woodland, and scrub	$122,982/acre	1:1	$122,982/acre	$15,004/acre	$1,722/acre	$139,708/acre	Limit of tree or shrub canopy (drip line)
Central California sycamore alluvial woodland	$112,316/acre	2:1	$224,632/acre	$27,405acre	$3,145/acre	$225,182/acre	Limit of tree or shrub canopy (drip line)
Coastal and valley freshwater marsh	$150,812/acre	1:1	$150,812/acre	$18,399/acre	$2,111/acre	$171,322/acre	Wetland boundary as determined through methods described in Section 6.8.4
Seasonal wetland	$164,983/acre	2:1	$329,966/acre	$40,256/acre	$4,620/acre	$374,842/acre	Same as for coastal and valley freshwater marsh
Ponds	$134,965/acre	1:1	$134,965/acre	$16,466/acre	$1,890/acre	$153,321/acre	Same as for coastal and valley freshwater marsh
Streams	$518/linear foot	1:1	$518/linear foot	$63/linear foot	$7/linear foot	$588/linear foot	Stream length measured along stream centerline

[1] See *Development Fee Nexus Study* for restoration cost assumptions and calculation of total cost for each land cover type.

[2] Source: **Table 5-13**.

[3] Restoration cost multiplied by compensation ratio.

[4] Source: **Table 9-8**.

[5] Source: **Table 9-9**.

Table 9-12. Fee Adjustment Indices

Fee	Annual Adjustment Index[1]	Historic Range of Index (Years)	Average Annual Rate of Index (Years)
Land Cover, Serpentine, and Nitrogen Deposition Fees			
a. Portion for Land Acquisition[2] (46% initially[3])	Change in the annual House Price Index (HPI) for the San Jose-Sunnyvale-Santa Clara, CA Metropolitan Statistical Area (MSA) for the prior calendar year (Federal Housing Finance Agency)[4]	–12.74% to 33.96% (1977 to 2009)	8.33% (1977 to 2009)
b. Portion for Preserve System Operation, Restoration, and Maintenance (54% initially[3])	Change in the Consumer Price Index for the San Francisco-Oakland-San Jose Combined Statistical Area for all urban consumers for the prior calendar year (U.S. Bureau of Labor Statistics)[5]	–10.0% to 18.35% (1915 to 2009)	3.57% (1915 to 2009)
Wetland and Burrowing Owl Fees	Same as b (Consumer Price Index)		

Notes:

[1] Habitat Plan fees to be adjusted on an annual basis by a date determined by the Implementing Entity's Governing Board within the first 6 months of Plan implementation based on the indices for the prior calendar year.

[2] Direct land acquisition costs only. Excludes costs associated with land transaction, site improvements, and due diligence (e.g., pre-acquisition surveys).

[3] The portion of the base development fee and temporary impact fee that will be adjusted according to the HPI and CPI will vary over time. For the first annual automatic adjustment, 46% of the initial fees will be adjusted according to the HPI and 54% will be adjusted according to the CPI. The apportionment in subsequent years will depend on the proportional estimate of land cost to the rest of Plan costs.

[4] See <http://www.fhfa.gov>. Data for the prior calendar year are published in March.

[5] Consumer Price Index, All Items, with base data year of 1982–1984 (i.e., 1982–1984 = 100), for all urban consumers (CPI-U), not seasonally adjusted. See <http://www.bls.gov/>.

Table 9-13. Federal and State Funding Sources for HCPs and NCCPs in California

Program Name	Program Administrator	Funding Source	Funding Available in California	Year	Description	Eligibility	Santa Clara Valley Habitat Plan Potential
Endangered Species Act Section 6 Grants	U.S. Fish and Wildlife Service, California Department of Fish and Game	Federal	$194,891,458	2007–2011 annual average	Grants for HCP land acquisition; current USFWS policy requires non-federal match of 25% that cannot be from local mitigation fees.	HCPs	Strong
Land and Water Conservation Fund	California Department of Parks and Recreation	Federal	$1,275,155	2007	Dollar-for-dollar matching grants for planning, acquisition, and development of outdoor recreation areas and facilities	Cities, counties and districts with authority to acquire, develop, operate and maintain public park and recreation areas	Moderate; used by County Parks in past
Farm and Ranch Land Protection Program	Natural Resource Conservation Service	Federal	$2,407,474	2007	USDA provides up to 50% of conservation easement value; requires partnerships with other agencies.	Active farm and ranch lands	Very limited
Environmental Quality Incentives Program	Natural Resource Conservation Service	Federal	$74,384,767	2011	Financial assistance to plan and implement conservation practices that address natural resource concerns and for opportunities to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland.	Owners of active agricultural, forest production, or ranch lands that have a natural resource concern.	Uncertain; higher likelihood for projects that align with annual natural resource concern initiatives
Wildlife Habitat Incentive Program	Natural Resource Conservation Service	Federal	$3,601,152	2011	Provides technical and financial assistance to landowners and others to develop upland, wetland, aquatic, and other types of habitat that supports fish and wildlife populations of National, State, Tribal, and local significance.	Private agricultural land including cropland, grassland, rangeland, pasture, and other land suitable for fish and wildlife habitat development, nonindustrial private forest land including rural land that has existing tree cover or is suitable for growing trees, and Indian land.	Uncertain

Program Name	Program Administrator	Funding Source	Funding Available in California	Year	Description	Eligibility	Santa Clara Valley Habitat Plan Potential
North American Wetlands Conservation Act Grant Program	U.S. Fish and Wildlife Service	Federal	$9,485,299	2006–2007	Program provides matching grants to aid in wetland conservation projects, including land acquisition, restoration, and enhancement. Non-federal match must be at least 1:1.	Non-federal agencies, organizations, or individuals	Uncertain
Landscape Conservation Cooperatives	U.S. Fish and Wildlife Service	Federal	$18,000,000	2011–2012	New program to apply strategic habitat conservation through partnerships with other federal agencies, states, tribes, NGOs, and stakeholders. Program established to improve science and management decisions in response to climate change.	Habitat Plan within California Landscape Conservation Cooperative, one of 16 established throughout the country.	Uncertain
Central Valley Project (CVP) Improvement Act Habitat Restoration Program	U.S. Fish and Wildlife Service and U.S. Bureau of Reclamation	Federal	$1,000,000–4,000,000 annually	1996 to present	Provides funds for land acquisition, management, monitoring, research, restoration for endangered / threatened species impacted by the CVP.	Federal and State government agencies, private non-profit or profit organizations, and individuals	Strong
Sustainable Communities Planning Grant Program	U.S. Department of Housing and Urban Development	Federal	$100,000,000 nationwide	2011	Provides funds to cities and counties to improve regional planning efforts that increase the capacity to improve land use and zoning.	Undetermined; new program	Unknown
Habitat Conservation Fund	California Department of Parks and Recreation	State, Other[1]	$2,000,000	2007	Program requires dollar for dollar match from non-state source for wetlands, riparian, trails/programs and anadromous/trout categories.	Cites, counties and districts	Moderate; used by County Parks in past

Table 9-13. Continued

Program Name	Program Administrator	Funding Source	Funding Available in California	Year	Description	Eligibility	Santa Clara Valley Habitat Plan Potential
Recreational Trail Fund	California Department of Parks and Recreation	Federal[2]	$6,037,429	2008	Federal money for non-motorized trail projects; RTP will provide up to 80% of total project costs.	Cities, counties, districts, state agencies and nonprofit organizations with management responsibilities over public lands	Moderate; used by County Parks in past
San Francisco Bay Area Conservancy[3]	California Coastal Conservancy	State, Proposition 40	$40,000,000	Total funding allocation through time	Funding from Proposition 40 and Proposition 50 for acquisition, development, rehabilitation, restoration and protection of land recourses and for Bay Area coastal watershed and wetlands protection, plus acquisition of agricultural and open space properties.	The State Coastal Conservancy, public agencies and nonprofit organizations (land trusts)	Nearly fully encumbered, but $1.6 million is budgeted for projects that may be compatible with the Habitat Plan. Used by County Parks in past.
Soap Lake Floodplain Preservation Grant Program	Pajaro River Watershed Flood Prevention Authority	State, Proposition 50 (Chapter 8)	$3,500,000	2008	Grants for land acquisition and easements in Soap Lake area (Santa Clara and San Benito Counties)	TBD	Likely strong
CalFed Bay-Delta Programs	California Bay Delta Authority and other California agencies	State, Proposition 50	$270,000,000	Total funding allocation through time	Various programs funded by Proposition 50 for habitat restoration and protection, conservation and restoration of watersheds.	State, federal, local and non-governmental agencies are eligible.	Moderate

Table 9-13. Continued

Program Name	Program Administrator	Funding Source	Funding Available in California	Year	Description	Eligibility	Santa Clara Valley Habitat Plan Potential
Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 - Forest and Wildlife Conservation	Wildlife Conservation Board, State Coastal Conservancy, California Department of Parks and Recreation	State, Proposition 84	$450,000,000	Total funding allocation through time	Proposition 84 provides various funding allocations for forest conservation and protection projects and development, rehabilitation, restoration, acquisition and protection of habitat. This includes specific funding for NCCP implementation. $10 million allocated to Wildlife Conservation Board for NCCPs in 2009 state budget.	$180,000,000 is allocated for forest conservation and protection projects; $135,000,000 is allocated for development, rehabilitation, restoration, acquisition and protection of habitat; $90,000,000 is allocated for NCCP establishment or implementation; $45,000,000 is allocated for the protection of ranches, farms, and oak woodlands;	Strong
Same as above	Strategic Growth Council	State, Proposition 84 (Chapter 8)	$60,000,000	2010–2013	The Sustainable Communities Planning Grant and Incentive Program.	The program provides $48 million to support development and implementation of local plans to help the state meet AB32 greenhouse gas emission reduction targets and implement SB375. Cities and counties developing or implementing NCCPs are eligible.	Strong
“Mountain Lion Fund”	State Coastal Conservancy, California Department of Parks and Recreation, Wildlife Conservation Board	State, Proposition 117	$30,000,000	Annual funding through 2020	Proposition 117 provides at least $30 million statewide each year for wildlife habitat preservation, including wetlands, stream and riparian habitat. Half must be spent in northern California.	$21 million is allocated to the WCB for purposes of the Dept. of Fish and Game. $4.5 million is allocated for local park, recreation and open space agencies as matching awards from the state. $4.5 million is for the Coastal and Tahoe Conservancy.	Moderate; used by County Parks once in 1990’s for joint acquisition with MROSD (Jacques Ridge property)

Program Name	Program Administrator	Funding Source	Funding Available in California	Year	Description	Eligibility	Santa Clara Valley Habitat Plan Potential
Clean Water State Revolving Fund	Environmental Protection Agency	Revolving fund	$67,105,000	2007	Revolving fund provides low-interest loans for projects that improve water quality and reduce nonpoint source pollution, including wetland preservation, restoration and creation, and the protection of vernal pools and associated habitat such as oak woodlands. Loans can cover 100% of project costs with no cash up front.	Revolving fund loans are available to local governments, non-profits, municipalities, farmers, and homeowners.	Moderate

[1] Initiated by the California Wildlife Protection Act of 1990.

[2] Administered at the federal level by the Federal Highway Administration.

[3] The San Francisco Bay Area Conservancy obtains funds via the Statewide California Coastal Conservancy program. The broader California Conservancy program also funds other projects in the San Francisco Bay Area, though they are all directly on the coastline, not in Contra Costa County.

Sources: East Contra Costa County HCP/NCCP; MuniFinancial; County of Santa Clara Parks & Recreation Department.

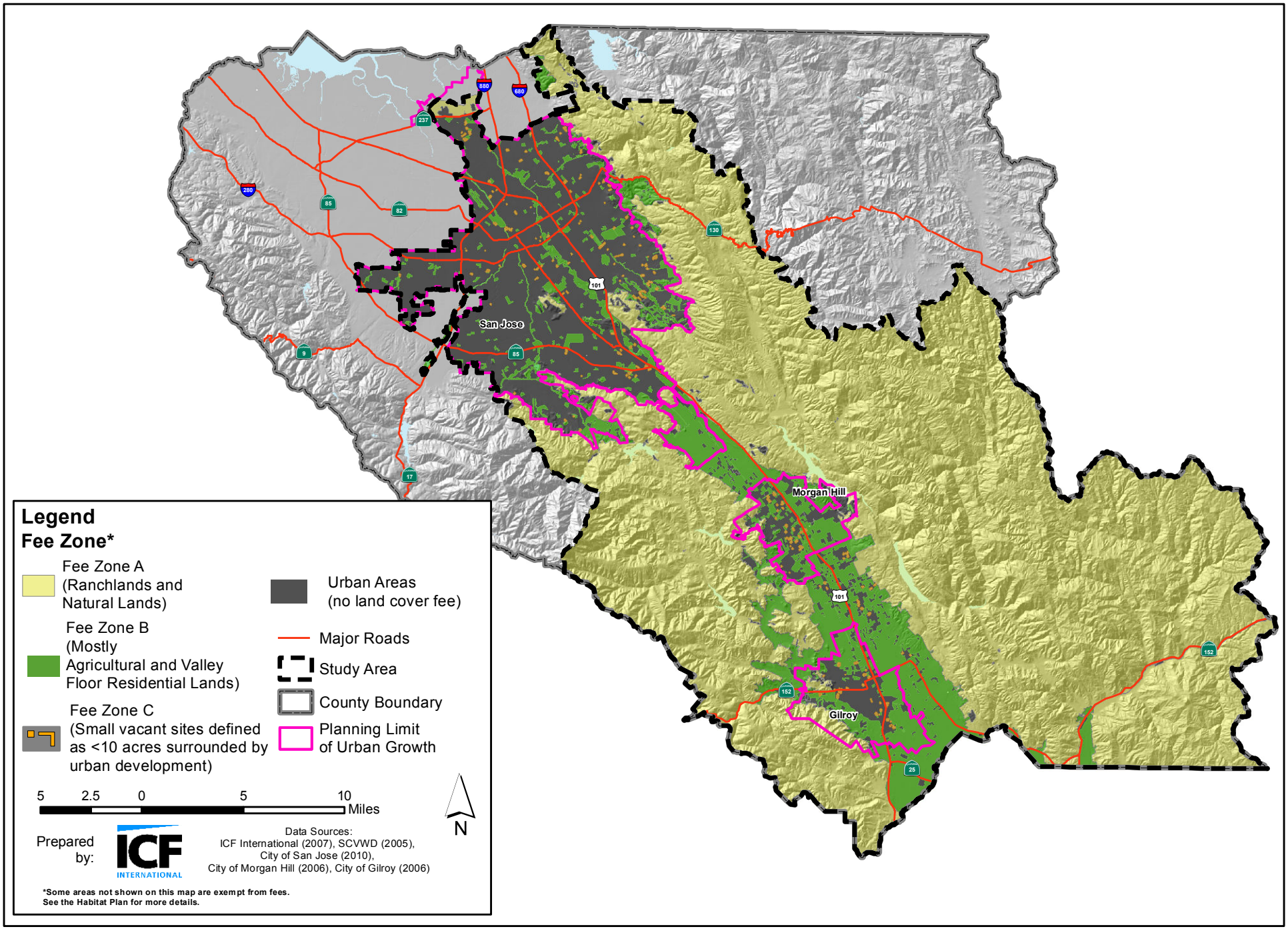

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Figure 9-1
Land Cover Fee Zones

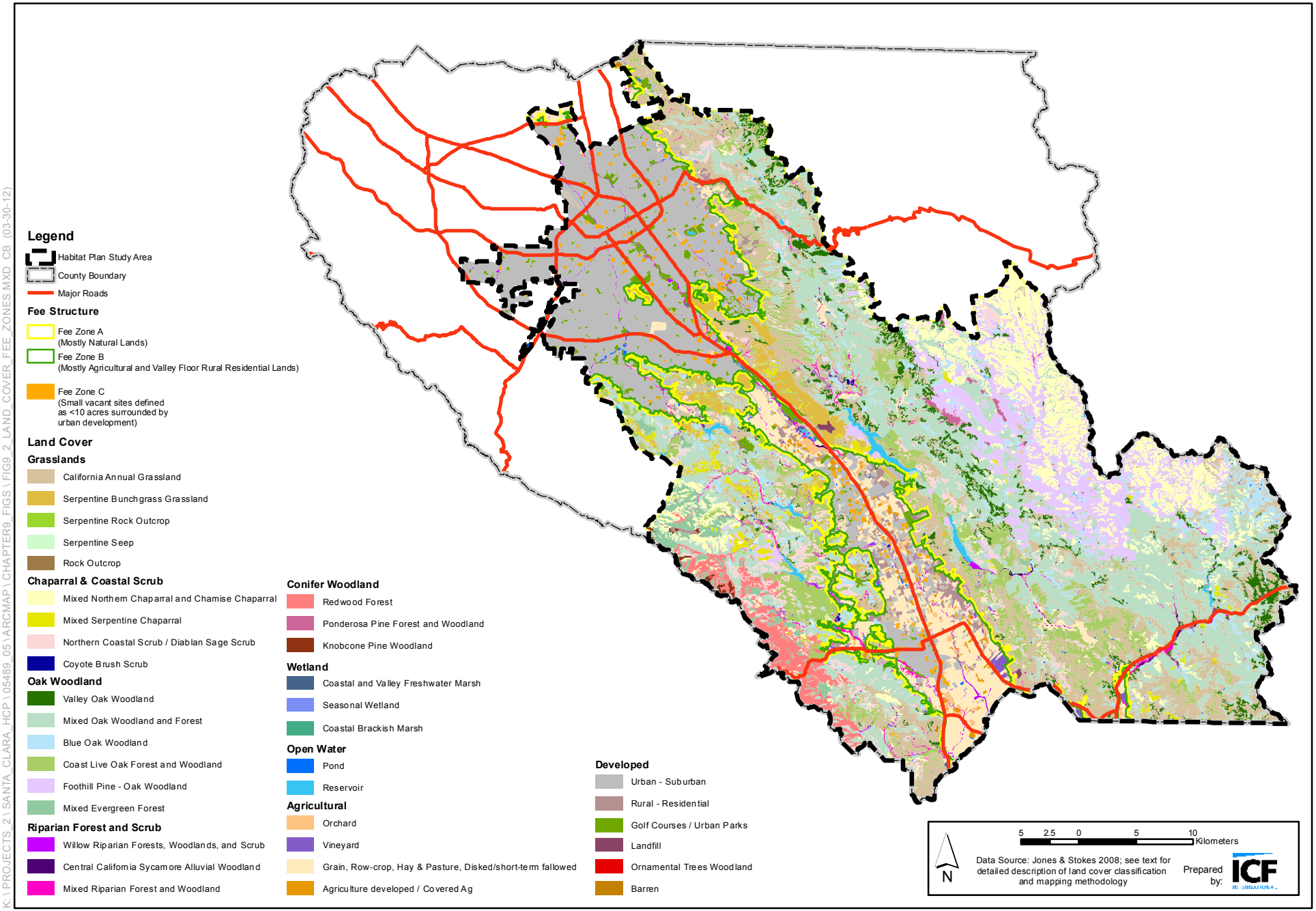

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Figure 9-2
Land Cover Types and Fee Zones

Chapter 10
Assurances

10.1 Introduction

This chapter discusses the assurances requested by the Permittees that will accompany the ESA Section 10(a)(1)(B) permits issued by USFWS and the NCCP permit issued by CDFG. This chapter also discusses assurances that will be provided to private landowners bordering Habitat Plan reserves, and outlines the process for changing or amending the Habitat Plan.

10.2 Assurances Requested by Permittees

The Permittees are requesting the following assurances from the Wildlife Agencies. Assurances specific to state or federal agencies are requested in Sections 10.2.3 *Federal Section 7 Consultations* (USFWS) and 10.2.7 *Assurances for Private Landowners* (CDFG).

10.2.1 Changed and Unforeseen Circumstances

Changed Circumstances

Changed circumstances are defined in the federal No Surprises Regulation[1] and for the state of California in the NCCP Act[2]. The federal No Surprises Regulation defines changed circumstances as those circumstances affecting a species or geographic area covered by the HCP that can be reasonably anticipated by the applicant or federal wildlife agencies and that can be planned for. Similarly, state regulation defines changed circumstances as those circumstances that are reasonably foreseeable and could affect a covered species or geographic area covered by the plan. Accordingly, these regulations require that potential changed circumstances be identified in the Plan along with remedial measures that would be taken to address these changes. The changed circumstances that could arise in the study area have been identified and are described below.

[1] 63 Federal Register 35 (1998) (amending 50 CFR 17.22(b)(5), and 222.307(g)).
[2] California Fish and Game Code § 2805(c).

If a changed circumstance occurs within the study area as defined by these sections, the Implementing Entity will notify the Wildlife Agencies of this changed circumstance within seven days after learning that any changed circumstances defined by these sections has occurred. The Implementing Entity will modify its activities in the manner described below, to the extent necessary to address the effects of the changed circumstances on the Plan's conservation strategy, and will report to the Wildlife Agencies on its actions. The Implementing Entity will make such modifications without awaiting notice from the Wildlife Agencies. Pursuant to the No Surprises Regulation, if such changed circumstances were addressed in the Habitat Plan and they occur during the permit term, implementation of their remedial measures is required. The Wildlife Agencies will not require any additional conservation or mitigation to address changed circumstances that are not identified in the Plan, without the consent of the Permittee, as long as the Plan is found to be properly implemented. *Properly implemented* means that the commitments and the provisions of the Plan, Implementing Agreement, and permits have been or are being fully implemented. In addition, the Wildlife Agencies will not require measures to address changed circumstances that are identified in the Plan beyond the remedial measures identified in the Plan.

Unforeseen Circumstances

Unforeseen circumstances are defined by federal regulation (50 CFR §17.3) as:

> changes in circumstances affecting a species or geographic area covered by a conservation plan or agreement that could not reasonably have been anticipated by plan or agreement developers and the Service at the time of the conservation plan's or agreement's negotiation and development, and that result in a substantial and adverse change in the status of the covered species.

The NCCP Act (California Fish and Game Code Section 2805[j]) defines unforeseen circumstances as:

> changes affecting one or more species, habitat, natural community, or the geographic area covered by a conservation plan that could not reasonably have been anticipated at the time of plan development, and that result in a substantial adverse change in the status of one or more covered species.

In the event of unforeseen circumstances during the permit term, amendments to the Habitat Plan may be proposed by either the Implementing Entity or the Wildlife Agencies to address these circumstances. The Wildlife Agencies and the Implementing Entity would work together to identify opportunities to redirect resources to address unforeseen circumstances. However, the Permittees request assurances consistent with the federal No Surprises Regulation and the NCCP Act that the Wildlife Agencies will not:

- require the commitment of additional land, water, or financial compensation by the Permittees in response to unforeseen circumstances other than those agreed to elsewhere in the Habitat Plan; or
- impose additional restrictions on the use of land, water, or natural resources otherwise available for use by the Permittees under the original terms of the Habitat Plan to mitigate the effects of the covered activities or in response to unforeseen circumstances.

As described in the No Surprises Regulation, it is the Wildlife Agencies' responsibility to demonstrate the existence of unforeseen circumstances using the best scientific and commercial data available. For the purpose of this plan, "unforeseen" circumstances are circumstances that are highly unlikely and not reasonably foreseeable to occur and thus will not be funded by this Plan.

The federal No Surprises Regulation does not limit or constrain the USFWS or any federal, state, local, or tribal government agency, or private entity, from taking additional actions at its own expense to protect or conserve covered species. The federal No Surprises Regulation also does not prevent USFWS from asking the Permittees to voluntarily undertake additional mitigation on behalf of the affected species.

Changed and Unforeseen Circumstances Addressed by this Plan

The changed and unforeseen circumstances listed below are recognized by this Plan (**Table 10-1**). Remedial actions to address changed circumstances are funded by the Plan and are also described below. The Implementing Entity will maintain sufficient financial reserves to fund all remedial actions described below, as they arise. A discussion of each circumstance follows.

- Covered Species Listed.
- Non-Covered Species Listed.
- Global Climate Change.
- Fire.
- Nonnative Species or Disease.
- Flooding.
- Drought.
- Earthquakes.

Other potential changed circumstances were considered but rejected. For example, emergency situations and their corresponding remedial actions are not addressed under the Plan. While we can predict that over the course of a 50-year permit term there will be emergencies situations, it is impossible to predict exactly what these emergencies will be. Past emergency situations in the study area that have resulted in the take of covered species include chemical spills, oil

run-off, and spills of garlic processing waste in creeks. Because of the difficulty predicting the size, type, frequency and effect of emergency situations, the Permittees do not consider such events to be changed circumstances under the Plan. If such an event occurs as a result of a Permittee facility or action, the Permittee is responsible for any take that may occur. Each Permittee will assume responsibility for the emergency situation and remedial measures if and when they do occur in the future, just as they would if there were no HCP/NCCP.

Covered Species Listed

Each covered species in the Habitat Plan has been treated as though it is listed under ESA and CESA. The Permittees propose that all listed and nonlisted covered species be included on the permits. Take of listed plant species by non-federal entities is not prohibited under ESA and therefore the Permittees do not require take authorization. The following plant species are proposed to be included on the federal permits in recognition of the conservation benefits provided for them under the Plan. These species would also receive No Surprises assurances under USFWS's No Surprises Regulation (63 FR 8859-8873; see Section 10.2.3 *Federal Section 7 Consultations* in this chapter).

- Tiburon Indian paintbrush (*Castilleja affinis* subsp. *neglecta*)
- Coyote ceanothus (*Ceanothus ferrisae*)
- Mount Hamilton thistle (*Cirsium fontinale* var. *campylon*)
- Santa Clara Valley dudleya (*Dudleya setchellii*)
- Fragrant fritillary (*Fritillaria liliacea*)
- Loma Prieta hoita (*Hoita strobilina*)
- Smooth lessingia (*Lessingia micradenia* var. *glabrata*)
- Metcalf Canyon jewelflower (*Streptanthus albidus* ssp. *albidus*)
- Most beautiful jewelflower (*Streptanthus albidus* ssp. *peramoenus*)

The Permittees propose that the Section 10(a)(1)(B) permit be effective for all listed covered species immediately after the adoption of all local implementing ordinances (see Chapter 8, Section 8.5 *Local Implementing Ordinances*). Should USFWS list a covered species during the permit term, take coverage will become effective for that species once the Conference Opinion for that species is converted to a Biological Opinion. No changes to the terms and conditions of the Implementing Agreement or modifications to conservation measures are required.

Under Section 2835 of the California Fish and Game Code, CDFG may issue take authorization for covered species (plants or wildlife) regardless of their listing status. As stated in the NCCP Act, "At the time of plan approval, the [California] department [of Fish and Game] may authorize by permit the taking of any covered species whose conservation and management is provided for in a natural community conservation plan approved by the department."

Non-Covered Species Listed

Over the course of Plan implementation (50 years), the Wildlife Agencies may list as threatened or endangered under ESA or CESA species that are not covered under the Plan. If a non-covered species becomes listed, the following remedial measures will be taken.

- The potential impacts of covered activities on the newly listed species will be evaluated, including an assessment of the presence of suitable habitat in impact areas.
- The Implementing Entity will develop measures to fully avoid impacts on the newly listed species until the Plan is amended to cover the species or will comply with ESA and CESA via other means (i.e., individual Section 7 consultations, consistency determinations, etc.).

Should a species not covered by the Plan be listed, proposed, or petitioned for listing, the Permittees may request that the Wildlife Agencies add the species to the Section 10(a)(1)(B) permit and NCCP permit. In determining whether or not to seek incidental take coverage for the species, the Permittees will consider, among other things, whether the species is present in the study area and if otherwise lawful activities could result in incidental take of the species. If incidental take coverage is desired, the Plan and permits could be modified or amended. Alternatively, the Permittees could apply for new and separate permits. Procedures for modifications and amendments to the Plan are outlined in Section 10.3 *Modifications to the Plan* below.

Global Climate Change

Global climate change is occurring as a result of high concentrations of greenhouse gases in the Earth's atmosphere (National Research Council 2010; Intergovernmental Panel on Climate Change 2007). Greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxide, chlorofluorocarbons, and ozone. These gases absorb energy emitted by the Earth's surface, and then re-emit some of this energy back to Earth, warming the Earth's surface, and influencing global and local climates. As more and more greenhouse gases are emitted into the atmosphere from human activities such as the burning of fossil fuels, the Earth's energy balance is disrupted, resulting in a number of changes to the historical climate. Evidence of long-term changes in climate over the twentieth century include the following (Intergovernmental Panel on Climate Change 2007; National Research Council 2010; Global Change Research Program 2009):

- An increase of 0.74 degree Celsius (°C) (1.3 degrees Fahrenheit [°F]) in the Earth's global average surface temperature;
- An increase of 0.17 meter (6.7 inches) in the global average sea level;
- A decrease in arctic sea-ice cover at a rate of approximately 4.1% per decade since 1979, with faster decreases of 7.4% per decade in summer;

- Decreases in the extent and volume of mountain glaciers and snow cover;
- A shift to higher altitudes and latitudes of cold-dependent habitats;
- Longer growing seasons; and
- More frequent weather extremes such as droughts, floods, severe storms, and heat waves.

Current global and regional trends suggest that climate change is likely to have an effect on the study area (see **Appendix F** for a complete discussion). However, current or near-term forecasting technology for modeling changes in climate at the regional or county scale is not effective. By mid-century, the average annual mean temperature in California is projected to rise from 1.1°C (2°F) to more than 2.8°C (5°F), with little to no change in total annual precipitation (Luers et al. 2006). There is significant variability in the precipitation projections by individual model and emissions scenario. Individual simulations suggest that there could be up to a 10 to 20% decrease in total annual precipitation (Luers et al. 2006)[3]. Model predictions for California range from a 6mm (0.24 inches) annual decrease in precipitation to a 70 mm (2.76 inches) annual increase (Hayhoe et al. 2004). Consequently, it is likely that the climate in the study area would shift to be warmer and dryer.

A number of ecological responses to climate change could occur in the study area. First, the timing of seasonal events, such as migration, flowering, and egg laying, may shift earlier or later (Walther et al. 2002; Forister and Shapiro 2003; Root et al. 2003; Root et al. 2005). Such shifts may affect the timing and synchrony of events that must occur together, such as butterfly emergence and nectar availability. Second, range and distribution of species and natural communities may shift (Parmesan 1999; Pimm 2001; Walther et al. 2002; Easterling et al. 2000). Range is the area over which a species occurs or potentially occurs, whereas distribution refers to where a species is located within its range. This is of particular concern for narrowly distributed species that already have restricted ranges due to urban growth or altitudinal gradients. Historically, some species could shift their ranges across the landscape. Today, urban and rural development prevents the movement of many species across the landscape. Species or natural communities that occur only at high elevation (e.g., ponderosa pine woodland in the study area) or within narrow environmental gradients (e.g., Bay checkerspot butterfly, Mount Hamilton thistle) are particularly vulnerable to changing climate because they likely have nowhere to move if their habitat becomes less suitable (Shainsky and Radosevich 1986; Murphy and Weiss 1992; Thorne 2006, PIER Conference; J. Hillman pers. comm.).

Second, increases in disturbance events, such as fire or flooding, could increase the distribution of disturbance-dependent land cover types, such as redwood

[3] The California Climate Change Center report summarizes projections using the National Center for Atmospheric Research Parallel Climate Model (PCM1), Geophysical fluids Dynamic Laboratory (GFDL) CM2.1, and the United Kingdom Met Office Hadley Centre Climate Model, version 3 (HadCM3) under the Intergovernmental Panel on Climate Change (IPCC) Special Report on Emission Scenarios (SRES) B1 (low emissions), A2 (moderately-high emissions), and A1Fi (high emissions).

forest and annual grassland, within the study area (Brown and Hebda 1998; Lenihan et al. 2003; Fried et al. 2004; California Climate Change Center 2006; Rogers and Westfall 2007). An increase in the frequency and intensity of disturbance could increase the likelihood that these events will harm or kill individual covered species, many of which are already quite rare. Events that occur with unpredictable or random frequency (called stochastic events) such as those describe above can have an inordinately negative effect on rare species.

Third, the number or density of individuals found in a particular location may change. This may be triggered in large part by changes in resource availability associated with an increase or decrease in precipitation (Martin 1998; Dukes and Mooney 1999; Walther et al. 2002; Lenihan et al. 2003; Millar et al. 2006; Pounds et al. 2006). Changes such as these may benefit one species at the expense of another.

Fourth, over a longer time period, species may change in outward appearance and behavior. Changes in climate may favor different adaptive strategies or appearances that may lead to genetic shifts (Davis and Shaw 2001). An example of this would be a shift to smaller average body size of certain mammals to use limited food sources for maintenance rather than growth.

The conservation strategy, reserve design, and monitoring and adaptive management program anticipate possible effects of climate change using a multi-scale approach that views conservation through landscape, natural-community, and species level. This approach focuses on protecting and enhancing a range of natural communities, habitat types, and environmental gradients (e.g., altitude, aspect, slope), as well as other features that are important as global warming changes the availability of resources and habitat types in the study area.

Implementing conservation actions that protect a variety of landscapes over a large scale provides flexibility for shifts in range and distribution of species and natural communities due to climate change. Land-acquisition actions target properties that provide connectivity to allow for northward and upslope movement, maintenance and restoration of habitat linkages, and reduced habitat fragmentation. In addition, habitat types across environmental gradients would be targeted for acquisition in the Reserve System to provide topographic diversity, thereby reducing the chance of population extinction (Murphy and Weiss 1992). As a result, some species and natural communities in the study area would continue to be able to "move" in response to climate change, allowing for shifts in range and distribution.

At the natural-community level, conservation and monitoring actions were developed to address natural communities primarily through the enhancement, restoration, and management of vegetation types (i.e., land cover types) and monitoring those changes. Habitats will be managed to ensure natural community and species persistence in the face of abundance shifts driven by climate change. Enhancement, restoration, and management actions will likely increase the resilience of natural communities by improving habitat quality overall and controlling invasive plants and nonnative predators.

At the species level, conservation and monitoring actions were developed to supplement and focus actions developed at broader scales and to ensure that all the needs of particular species are addressed. These species-specific actions will help ensure that shifts of range, distribution, and abundance driven by climate change are buffered by protection and enhancement of individuals, populations, and groups of populations. Status and trends monitoring will serve as an early warning for the possible effects of climate change and will allow the conservation strategy to adapt to ensure species persistence in the study area.

In addition to the conservation actions, monitoring actions will allow for the early detection of trends driven by climate change over multiple scales. Landscape-level monitoring is designed to detect large-scale changes, such as changes in ecosystem processes, shifts in natural-community distribution, and the integrity of landscape linkages. Community-level monitoring would, in turn, detect changes in the composition and function of natural communities, populations of key predator or prey populations, invasive species, and other important habitat factors for covered species. Finally, species-level monitoring would measure the effects of management actions on covered species and the status and trends of covered species in the Reserve System. Collectively, these monitoring actions will allow the Implementing Entity to detect and respond to the effects of climate change. Taken together, conservation and monitoring actions described above will help buffer against the effects of climate change in the study area.

Climate change is considered a foreseeable event and is therefore a changed circumstance. For the purposes of the Plan, limits on the changed circumstance must be identified.

The Implementing Entity will use a method consistent with the California Climate Action Team[4] for measuring temperature change within the study area. The baseline index, as measured from the Gilroy, Morgan Hill, and San José weather stations, will be historic temperatures from 1961 to 1990. For the purposes of the Plan, three baseline measurement periods will be set using 1961 to 1990 historic temperatures: average annual temperature, average summer temperature (June, July, and August), and average winter temperature (December, January, and February). If modeled California climate-change trends are applied to the study area, one may anticipate that the temperature could increase up to 2.8°C during the permit term. Under the Plan, the following is considered changed circumstances for which remedial measures will be funded.

- An increase in temperature of up to 2.8°C for any of the three baseline periods measured as a 10-year running average.

The Implementing Entity's response to the changed circumstance of global climate change will vary by the character and magnitude of the physical and biological changes observed. Responses may include those listed below. All responses will occur within one year of identifying changed circumstances, unless the Wildlife Agencies concur on a case-by-case basis that specific remedial actions would require more time to initiate.

[4] http://www.climatechange.ca.gov/climate_action_team/index.html

- Enhanced monitoring to detect ecological responses to climate change (see Chapter 7).
- Identification of target species most vulnerable to climate change and increased status-and-trend monitoring for those species.
- Alterations to the conceptual ecological models for natural communities and covered species as a tool to devise improved management actions (see Chapter 7).
- Altered or more intensive management actions on target/vulnerable species to facilitate shifts in species distribution (e.g., more active population management of covered species).
- More aggressive control of invasive species that respond positively to climate change.
- Implement other measures through the Adaptive Management Program (see Chapter 7) in ways consistent with permit obligations and with the consent of the Implementing Entity.

Thresholds for events that are not reasonably foreseeable have been established for determining unforeseen circumstances. Unforeseen circumstances not funded by the Plan include the following.

- A temperature increase greater than 2.8°C will be considered an unforeseen circumstance. Temperature increases will be measured for the three baseline periods measured as a 10-year running average.

Limits on the variation in other parameters (e.g., rainfall) are much more difficult to determine. Given the seasonality of rainfall in the study area, an increase in winter precipitation may be offset by increased evapotranspiration during the summer months (Intergovernmental Panel on Climate Change 2007). A decrease in winter precipitation would be exacerbated by increased summer temperatures, leading to increased drought. Therefore, it is not possible at this time to define limits of rainfall patterns that would qualify as unforeseen circumstances. Regardless of increases or decreases in precipitation, it is anticipated that the number of strong storm events would increase during the winter season (Kim 2005). These events are more likely to result in flooding than in increased soil percolation or water storage recharge (California Natural Resources Agency 2009). Increased frequencies of flooding and drought are taken into account in the sections below addressing these changed circumstances.

Fire

Fire is a natural component of many ecosystems and natural community types, including grasslands, chaparral/northern coastal scrub, oak woodlands, and conifer woodlands. For each of these natural communities, fire frequency and intensity influence community regeneration, composition, and extent. To ensure that fire-dependent natural community processes occur, minimum suppression techniques and prescribed burning will be implemented as part of the Conservation Strategy (e.g., see Conservation Action LM-8 in Chapter 5).

However, it is possible that large, intense, and frequent fires could have a negative impact on natural communities and restoration projects. For example, more frequent, intense fires caused by high fuel loads and increased encroachment by woody species into grasslands could negatively affect community composition by favoring early successional species. Additionally, frequent, intense fires could cause *type conversion*, increasing the extent of certain natural communities, such as grassland, at the expense of others, such as chaparral or oak woodlands.

To determine the limits of changed circumstances, the size of catastrophic fires (e.g., fires over 10,000 acres) and their frequency (i.e., return interval) was assessed for the study area. This assessment was based on both historic fire occurrence and the influence of climate change. These conservative estimates for the study area were then scaled down to fit the Reserve System.

Using a conservative estimate, the total amount of land cover within the study area that is prone to wildfires is approximately 298,016 acres. Land cover types that are not prone to wildfire (i.e., low fuel loads, high moisture content) are riparian, wetland, agriculture, and developed land cover types and were subtracted from this total. Livestock foraging and grazing land is classified as grassland under the Plan; therefore, it is included as a land cover prone to wildfires.

Within the study area, regardless of size, wildfires occur at the average rate of once every 2 years (**Figure 10-1**). CAL FIRE has rated the fire probability in undeveloped portions of the study area as moderate to high. Recent fire history[5] for large fires (>100 acres) indicates that there have been 35 large fires since 1951 years. Large fires ranged from 134 acres to 5,813 acres. Of these, none were over 10,000 acres (i.e., catastrophic fires)[6]. There were four fires that occurred either partly within the study area or immediately adjacent to the study area (e.g., in State Parks lands) that were over 10,000 acres. These fires burned a total of 112,242 acres, or 38% of the land cover types prone to wildfire (also referred to as "burnable land cover").

Climate change must also be taken into account when predicting fire frequency in the study area. Throughout California, fire occurrence can be correlated with drought, moisture availability, and biomass (fuel) accumulation (Lenihan et al. 2003). Both "wetter and warmer" and "dryer and warmer" climate change scenarios are predicted for the study area (Hayhoe et al. 2004). The warmer, dryer scenario would increase the occurrence of drought, while increased biomass production would result from the warmer, wetter scenario. Both of these scenarios have the potential to increase fire frequency due to either increase drought frequency or increase in biomass accumulation. For the purposes of the calculation of changed and unforeseen circumstance, it is assumed that fire frequency will increase in the study area due to climate change.

[5] Calculations were based on data from 1956–2011.

[6] Catastrophic fires occurred as follows: 32,866 acres in 1961(Bollinger Ridge), 13,128 acres in 1985 (Lexington), 18,500 acres in 2003 (Annie), and 47,748 acres in 2007 (Lick).

With climate change, it is assumed that fire occurrence frequency and area burned will increase by 25%. Recent literature analyzing the relationship between climate change and fire frequency in California identified a median fire occurrence and burned area increase of 30% by 2050 (Westerling et al 2009). This is a statewide estimate with fire occurrence increases ranging from 11% to 55% and burned area increases ranging from 11% to 70%. The largest increases for both fire occurrence and burned area are expected to occur in the Sierra Nevada, Northern California Coast and south Cascade Ranges. These increases are expected to occur by 2050.

The potential effects of climate change on fire frequency are anticipated to increase over the course of the permit term. At the beginning of the permit term, limited change from historic fire occurrences and burned area may be acceptable as a changed circumstance; however, the potential effects of climate change will grow over the permit term. In addition, at the beginning of the permit term, fire risks in Reserve System will be low because it will be smaller. As such, it is felt that a 25% increase due to climate change represents a conservative estimate for the increase in fire frequency and burned area in the Plan area for the duration of the permit term.

Based on historic fires in the study area, it is foreseeable that four catastrophic fires could occur during the permit term, each burning 4 to 14% of the land cover types prone to wildfire within the study area. Increasing these values by 25% (0.04 * 1.25 and 0.14 * 1.25) to take climate change into account, the Plan anticipates up to five catastrophic fires within the study area over the course of the permit term each burning approximately 5 to 17% of the land cover types in the study area prone to wildfires (14,901 to 50,663 acres, respectively).

It is assumed that 46,141 acres within the Reserve System is burnable land cover. This includes all of the burnable land cover within lands newly acquired for the Reserve System (32,850 acres; see **Table 5-11**) plus all existing open space lands incorporated into the Reserve System (up to 13,291 acres; see **Table 5-5**). To be conservative, it is assumed that all of the land cover in existing open space is prone to wildfires, even though a portion is expected to be developed, aquatic, and riparian land cover types that are not prone to wildfires. The Reserve System represents 15% of the burnable land cover in the study area. The Reserve System will be composed of large blocks of habitat that will build off existing open space within the study area. Based on the expected reserve design, it is assumed that any one Reserve System unit will not exceed 20,000 acres. (Reserve units will be composed of Reserve System lands with similar management and monitoring needs.) Although managed similarly, these lands will not necessarily be contiguous (e.g., Coyote Ridge and Tulare Hill are anticipated to be located within the same Reserve unit, even though they are not contiguous). The largest block of contiguous parcels within any reserve unit will not exceed approximately 10,000 acres. Because the reserve system is distributed over a large geographic portion of the county, it is extremely unlikely that a single fire, even if very large, could burn a significant portion of the entire reserve unit.

For the purpose of assessing changed circumstances, this 15% is applied to anticipate fire occurrence within the Reserve System and enhanced lands.

Fifteen percent was chosen because the Reserve System represents 15% of the flammable land cover in the study area. It is assumed that only 15% of the catastrophic fires (one fire) will burn a portion of the Reserve System and enhanced lands. This one catastrophic fire would affect the same proportion of the burnable acreage of the study area as each of the five catastrophic fires projected to occur in the study area (i.e., approximately 5 to 17% or 14,901 to 50,663 acres). This suggests that 2,235 to 7,599 acres are likely to burn[7] in the Reserve System as a result of catastrophic fire during the permit term. As such, it is foreseeable, as a changed circumstance, that up to one fire burning 2,235 to 7,599 acres of the Reserve System could occur over the course of the permit term. A total acreage burned from a catastrophic fire exceeding 7,599 acres (16% of the Reserve System burnable land cover) within the Reserve System is highly unlikely and is not reasonably foreseeable, therefore would be considered an unforeseen event. Any number of fires, regardless of burned acreage in the Reserve System, will be remediated as a changed circumstance if enhancement, restoration or creation projects described in the conservation strategy are affected. However, remedial actions triggered by a single fire event that burns more than 7,599 acres of the Reserve System would be limited to enhancement, restoration and creation sites. The Implementing Entity would not be responsible for remediating all burned areas as a result of a fire or fires that exceed the thresholds described above.

The threshold of burned acreage in the Reserve System for the changed circumstance (7,599 acres) is a reasonable upper limit when compared to the largest fire in the County (Lick Fire, 47,748 acres) because of the differences between the expected configuration and location of the Reserve System and the location of this extreme fire event. First, the Lick Fire occurred at a higher elevation than the expected Reserve System where terrain is more rugged, drier, and supports greater fuel loads than the expected Reserve System. The elevation also contributed to the remoteness of the Lick Fire, which made it difficult to contain quickly. The Reserve System will occur in middle to lower elevations in the County that support relatively low fuel loads (e.g., a much greater proportion of annual grassland than chaparral) and with good access for fire crews. The fire size threshold also corresponds to the approximate upper limit of contiguous parcels in the Reserve System.

Fires that occur too frequently in the same area may result in type conversion of natural communities (e.g., from chaparral to grassland). The historic fire frequency for any given site in the study area, varies substantially among land cover types, location, and topography (**Table 10-2**) (Davis and Borchert 2006; Stuart and Stephens 2006; Willis 2006). Due to the varying fire return intervals, return intervals are broadly defined for the fire-prone natural community types within the study area. Pre-historic, historic, and current fire return intervals for each natural community did not provide significant support for defining changed

[7] Large catastrophic fires in the study area each burn 4 to 14% of the wildfire-prone land-cover types. These percentages were increased by 25% to take climate change into account. The increased percentages, 5% and 17%, were applied to the wildfire-prone land-cover types in the study area (298,016 acres) to determine the lower and upper limits of changed circumstances and the threshold at which circumstances would be considered unforeseen. 15% * 14,901 acres = 2,235 acres. 15% * 50,663 acres = 7,599 acres.

circumstances; rather the conceptual fire-return pattern classifications and expert opinion were used. For each natural community, remedial actions for changed circumstances will be applied up to the unforeseen threshold identified in **Table 10-2**. Remedial actions will be funded and carried out by the Implementing Entity when any number of fires, regardless of size, recur in the same area at intervals at or above the unforeseen circumstance thresholds identified in **Table 10-2**. Fire return intervals below the thresholds identified are considered unforeseen.

Fire potential in the study area is typically greatest in the months of June–September when dry vegetation co-occurs with low humidity. Generally, the vegetative communities within the Reserve System are adapted to a more frequent historic fire regime and would naturally recover from fire. Reserve unit management plans will include fire management and protection measures that will minimize the risk of damage to habitats and natural communities from abnormally frequent fire (normal fire frequency is described above). Preventative actions include those listed below.

- Create or redesign fuel breaks to limit fire spread.
- Consider the reintroduction of low-intensity prescribed fires to encourage fire-adapted plants and discourage non-fire-adapted invasive plants.
- Work with local fire agencies to improve fire-suppression preparedness and develop strategies to protect habitat during fire response.
- Incorporate public-awareness programs into reserve unit management plans. This includes public outreach to neighboring lands to minimize fire risk.

Should a wildfire take place, the Implementing Entity will follow protocols established in the reserve unit management plans and will work closely with local fire response crews to ensure that impacts on sensitive communities and covered species are minimized. This includes the identification and completion of appropriate post-fire restoration and rehabilitation responsibilities (see Chapter 5, Section 5.3.2 *Landscape Conservation and Management*). In addition, landscape-level monitoring will assess changes to land cover type, and natural community–level monitoring will assess the response of invasive plants as part of status and trends monitoring (see Chapter 7, Section 7.3.1 *Landscape-Level Actions*). In accordance with these conservation and monitoring actions, in the event of habitat loss, remedial measures shall take place to re-establish natural communities and covered plant populations lost to fire either to pre-fire conditions or as otherwise determined on a case-by-case basis.

Remedial measures apply to each of the episodes identified above. For example, if there was a grassland fire that burned 7,000 acres (meets the single event burned area criteria for changed circumstance) and a portion of the same area burned again in 15 years, remedial actions for both episodes would be funded. Remedial actions are listed below.

- Initiate a post-fire damage assessment within six months following the end of a fire in order to identify the appropriate post-fire restoration and rehabilitation actions.

- Initiate the appropriate actions, such as habitat restoration, invasive-species control and/or erosion control, in affected reserves to ensure the reestablishment of covered plants and other native vegetation through active or passive means, as appropriate, within one year post-fire.
- Implement measures through the Adaptive Management Program (see Chapter 7) in ways consistent with permit obligations and with the consent of the Implementing Entity.
- Ensure appropriate erosion control structures and applications (e.g., seeding) are in place prior to the next rainy season.

Nonnative Species or Disease

Nonnative species and diseases currently occur in the study area and will be present in the Reserve System (e.g., bullfrogs, hybrid tiger salamanders). Additionally, there are nonnative species and diseases that exist in areas outside the study area that have the potential to spread into the study area and adversely affect the covered species and natural communities within the Reserve System. Due to the nature of invasive species and diseases, there is no unforeseen circumstance, only an upper limit to which changed circumstances will be funded. In other words, a new disease or invasive species spreading throughout the study area within the permit term is a foreseeable event. However, if a disease or nonnative species spread beyond the thresholds identified below, it would be considered a catastrophic event beyond the Plan scope and remedial actions to address it would not be required to be funded by the Implementing Entity.

The conservation strategy includes measures to reduce existing and prevent future infestations of nonnative invasive species and diseases (see Chapter 5, Section 5.3.2 *Landscape Conservation and Management*). The monitoring program will identify and map existing diseases and nonnative species in the Reserve System so that new ones can be identified quickly and a control or eradication plan can be put into place. However, it is possible that the following events could occur despite implementation of the conservation strategy and monitoring program.

- New and aggressive nonnative species could invade the Reserve System.
- Infestations of a new disease that affects covered or predominant species in the study area (e.g., Sudden Oak Death) could have dramatic effects on the Reserve System.
- Existing nonnative species or diseases could expand to unprecedented levels in the Reserve System, perhaps due to changing climate.

Under the Plan, the following are considered changed circumstances for which remedial measures will be funded.

- Infestations of new diseases or new nonnative invasive species affecting up to 25% of the extent (i.e., acres) of a predominant natural community (i.e.,

oak woodland) or occupied covered species habitat within the Reserve System in any given year[8].

- Spread of nonnative species or diseases existing on up to 25% above current conditions within the Reserve System in any given year.

The Reserve System builds off of existing open space in the study area, targeting specific natural communities and species habitat across a range of environmental gradients in geographically distinct areas (i.e., Santa Cruz Mountains, valley floor, Diablo Range). Diseases and nonnative species could spread into the study area from lands adjacent to the study area. It is foreseeable that a single disease or invasive species would spread across the entire Reserve System even if the Habitat Plan and remedial measures are properly implemented. Such an event would be catastrophic and likely no effort by the Implementing Entity alone would be able to stop its spread. Therefore, if remedial measure implementation does not prevent the spread of the nonnative species or disease beyond the established thresholds, it would be considered a catastrophic event.

To ensure that remedial actions are implemented aggressively before the thresholds are reached, the Implementing Entity must demonstrate in writing to the Wildlife Agencies the following in order to justify cessation or reduction of remedial actions once the thresholds are crossed:

- The changed circumstance was detected as soon as feasible and the Wildlife Agencies were notified.
- The Implementing Entity coordinated and worked actively with the Wildlife Agencies and other land managers to assess the changed circumstance and determine the best course of action.
- The Implementing Entity implemented remedial measures for the changed circumstance according to the Plan but these measures failed to stop the spread of the disease or invasive species.
- The disease or invasive species is a serious problem outside the Reserve System in the study area and similar control measures implemented by others also failed to control their spread.

Based on current knowledge of likely diseases and nonnative species, disease spread at catastrophic levels is only reasonably likely in the study area for Sudden Oak Death. For other known diseases or nonnative species, the remedial measure thresholds are assumed to be sufficient.

Sudden Oak Death is not currently found in the study area; however it is found in adjacent Santa Cruz County[9]. This disease spreads rapidly and could spread into the Reserve System and affect more than 25% of the oak woodlands despite

[8] The Reserve System will be assembled for the majority of the permit term. All creation and restoration activities must be completed by Year 40 and all preservation must occur by Year 45. The Implementing Entity will monitor current levels of disease and nonnatives relative to the current composition of the Reserve System each monitoring year.

[9] In addition, Santa Clara County is a quarantine county for Sudden Oak Death under U.S. Department of Agriculture and California Department of Food Agriculture regulations.

implementation of the conservation strategy, adaptive management, and remedial measures. If this occurred, the spread of the disease would not be limited to the Reserve System and would affect the natural community at the landscape scale. If Sudden Oak Death spread beyond 25% it would be considered a catastrophic event. In contrast, in the case of bullfrogs, an existing nonnative species, it is not reasonably foreseeable that the species would spread to an additional 25% of aquatic communities (from baseline levels) in the Reserve System. Bullfrogs are expected to be controlled in the Reserve System through proper implementation of the conservation strategy and adaptive management program (which includes a major component of bullfrog eradication and control) and proper implementation of remedial measures, if needed. The spread of diseases or invasive species in excess of 25% above baseline conditions is foreseeable for Sudden Oak Death and may be foreseeable for other diseases not currently known. However, because these events are considered catastrophic, the Implementing Entity would only fund remedial actions for these circumstances up to the 25% thresholds identified above (for Sudden Oak Death or other diseases or invasive species).

There are a number of diseases and nonnative species that may harm covered species and the natural communities on which they depend. Diseases that may threaten covered species in the study area include chytrid fungus, which could affect foothill yellow-legged frog, California red-legged frog, and California tiger salamander (U.S. Fish and Wildlife Service 2002; 69 Federal Register 48570–48649), and possibly rana viruses, which could affect California tiger salamander (69 Federal Register 48570–48649). It is unknown whether these diseases are a problem for populations in the study area due to a lack of surveys. In general, the effects of diseases on the survival and reproduction of covered species is poorly known. The method of measurement of the extent of new diseases will be different for each disease (e.g., number of trees affected, proportion of species' range, number of populations).

Diseases that may affect or threaten natural communities include Sudden Oak Death. Although not currently in the study area, Sudden Oak Death has been confirmed in San Mateo, Santa Cruz, Alameda, and Contra Costa Counties, and portions of Santa Clara County outside the study area; consequently, there is a high likelihood for it to spread into the study area during the permit term. Spread of this disease in the study area could lead to change in species composition, type conversion, and an increased risk of fire due to standing dead trees.

The list of nonnative plants and animals is much more extensive. They include but are not limited to invasive mussels, bullfrogs, nonnative pigs, and introduced predatory fish. These species currently occur in the study area, and conservation and monitoring actions to reduce or contain their occurrence within the study area have been developed.

When a new disease or nonnative species is detected or an existing disease or nonnative species begins to spread aggressively, the Implementing Entity will contact the Wildlife Agencies to collaboratively determine the best method of measuring, monitoring, and eradicating or controlling the disease before it

spreads[10]. Remedial measures that address the invasion of nonnative species or disease follow the steps listed below.

- Determine the best method for measurement and tracking extent within 3 months of detection.
- Prepare a damage-assessment report within 6 months of detection.
- Recommend and plan actions to address the threat within 6 months of detection.
- Respond through adaptive management in ways consistent with permit obligations and with the consent of the Wildlife Agencies within one year of detection.

Flooding

Flooding is a natural event in stream systems, having both beneficial and detrimental effects on natural communities. Beneficial effects include limited scouring and thinning of homogeneous stands of riparian vegetation. However, detrimental effects of floods along stream channels with new riparian plantings could include destruction of enhanced or restored sites and created covered plant populations. This would require substantial remediation.

Major floods are defined as flood events that exceed the stream's capacity (i.e., 10-year flood event). Several major floods have been documented since European settlement in Santa Clara County, most recently in 1967, 1978, 1980, 1982, 1983, 1986, 1995, 1996–1997, and 1998. Flooding probability is specific to each stream's capacity, the runoff potential of the stream's upper catchment, and rainfall patterns across the county. Given that urbanization has increased across the county (increasing flood potential) and that local agencies have completed and continue to develop flood control projects to accommodate increased peak runoff (decreasing flood potential), past flood events do not reliably predict future flood probability.

In most cases several major floods occur within a given year in multiple watersheds. For example, a particularly wet year allows for increase rainfall throughout the County. Extended periods of high rainfall cause soil saturation. Factors such as stream capacity and runoff potential also increase the likelihood of flooding throughout the study area increases. This allows for multiple events to occur in a given year.

Taking into account climate change, we must rely on predictive models in addition to historic trends. Climate change models typically focus on the occurrence of 100-year flood events. While there is a discrepancy over whether precipitation will increase or decrease in the study area, it is expected that storms

[10] A recent example of such a situation was the discovery in 2000 of barbed goat grass on Coyote Ridge, a highly invasive plant not previously known in that area. Local biologists and land managers coordinated with the Wildlife Agencies on appropriate rapid responses to the threat. After trying several techniques and applying the most effective techniques over multiple years, by 2008 the infestations were nearly eradicated (S. Weiss pers. comm.).

at or below the 100-year event are reasonably likely within the permit term and could potentially increase in frequency in the county due to climate change (Hayhoe et al. 2004; Kim 2005; California Natural Resources Agency 2009). The 100-year flood (i.e., one-percent flood) is defined as the flood event that has a 1% probability of occurrence in any given year. Over a very long period of time, it is the flood event that would, on average, occur once per hundred years; however, over a short time span, it can occur more than once in a single year or not at all for several hundred years. For example, a one-year storm event has a 100%, approximately, probability of recurring each year. This does not mean that that a 1-year event will happen every year; however it is highly likely to happen each year. A 100-year storm event has a 1% probability of recurring each year.

The 100-year flood event for an individual creek or reach of creek is expressed as a "Q" or flow rate. The "Q" can be modeled, and/or estimated by using a variety of data sets. The estimated "Q" or flow rate for a given storm event (i.e., 1-year, 10-year, 50-year, 100-year) will be as accurate as the data set you are using to estimate it. While the 100-year flow rates are available for the streams in the Plan Area, they are not a good indicator of flood event intensity and frequency for assessing changed circumstances.

Climate change models also demonstrate clear trends towards earlier snowmelt accompanied by increased frequency of winter flooding (Dettinger et al. 2004). These climate-change predictions are most likely to impact the study area later in the permit term, if at all, as the models predict more drastic hydrologic changes for the end of the century compared to mid-century. The flood-control standard for local agencies is the 100-year event. As such, these climate change driven hydrologic changes, along with changes from increased urbanization, are being taken into account by the SCWVD in flood control project design. Consequentially, climate change is not anticipated to have an effect on flood event intensity and frequency.

Major flood events could occur in the study area during the permit term and are therefore considered changed circumstances. Historically, most major flood damage occurred on the valley floor, away from almost all of the areas anticipated to be incorporated into the Reserve System, which will be located mostly in the lower to middle elevations. Portions of the Reserve System most susceptible to flooding would occur in lower elevations. The dams in these watersheds do not play a significant role in flood control (i.e., Pacheco Dam). Flooding may also be possible in the Reserve System in lower reaches of Uvas or Llagas Creek. Regardless of location, remedial measures will be implemented for all flood events that damage or destroy enhancement projects, restoration projects, creation projects, or in-stream conservation structures, so that success criteria can be met and compliance credit maintained. Thresholds for flood events that are not reasonably foreseeable have not been established for determining unforeseen circumstances.

Following a flood event, the site will be evaluated to determine appropriate corrective actions necessary to restore the habitat through active management or natural processes. Remedial actions (i.e., grading, new riparian plantings, debris

removal, covered plant restoration, etc.) will be implemented within a time period to maintain permit compliance with the Stay-Ahead provision for restoration, creation, and enhancement (see Chapter 8). Measures shall be implemented through the adaptive management program (see Chapter 7). The Implementing Entity will have the option of implementing remedial actions on site or in-kind. For example, if the cost to rebuild an enhancement, restoration or creation project exceeds the cost of constructing a new project, the Implementing Entity will have the option of constructing a new project elsewhere within the Reserve System of equivalent or greater biological value.

Drought

Drought is a natural part of a Mediterranean climate system to which species and natural communities have adapted. However, a prolonged drought could cause serious damage to the Reserve System, especially to new restoration plantings and enhanced or created populations of covered plants that have yet to become established. The following analysis was conducted to define droughts and estimate their expected frequency of occurrence in the study area. Droughts that occur within this expected frequency are considered a changed circumstance and are expected and funded over the course of Plan implementation; droughts outside this frequency are considered unforeseen.

To estimate how many drought years might be expected during the permit term, annual natural reservoir inflow (i.e., inflow from local precipitation, not imported water) within the study area was reviewed from 2010 back to 1925 by water year (July 1 to June 30). A drought is defined as two or more successive water years with 75% or less of the median inflow. These data show that droughts lasting 2 to 6 years occurred 4.2 times over any 50-year period. Of these droughts, only a single event lasted 6 years. A predictive study determined that droughts of 6 years are expected to occur two to three times in 100 years based on historic information (Dean et al. 1994). It is assumed that a drought of three or more years in length has an approximately 60% chance of occurring. While climate change is anticipated to result in increased drought potential, the extent of such change is not fully understood. Thus, the predicted drought potential during the permit term is conservative.

Based on historic data and conservative application of climate change predictions, remedial actions will be funded by the Plan for up to seven droughts, each one to eight years in duration, occurring during the permit term. Of the seven droughts, only one is anticipated to be eight years in duration. More than seven droughts during the permit term, more than a single drought of eight years, and any number of droughts exceeding eight years in duration each are considered unforeseen circumstances and not funded by the Plan.

The monitoring and adaptive management program includes monitoring of enhancement, restoration and creation sites. This will minimize the risk of losing mitigation plantings and restored habitats due to drought. Preventative measures will be included in the monitoring program (Chapter 7, Section 7.3.2 *Natural Community-Level Actions*) and are listed below.

- Monitor SCVWD natural reservoir inflow data in the study area to determine if the seasonal inflow at the end of April indicates a dry year (near 75% of inflow).
- Monitor mitigation sites that are beyond their establishment periods (i.e., no longer sustained by irrigation) but that have not achieved their success criteria for stress due to low soil moisture or high evapotranspiration rates.
- Extend preventative measures (e.g., longer-term supplemental irrigation) as necessary for enhancement, restoration, or creation projects that have not achieved their success criteria to prevent damage or losses due to drought and to assure success rates of the projects.

Should damage or losses due to drought occur, the Implementing Entity will assess the drought damage and initiate the following remedial measures within one year of damage or loss.

- Prepare damage assessment report.
- Identify actions to improve effects on covered species (e.g., provision of temporary artificial water sources).
- Identify actions to improve effects on enhanced, restored, or created habitats that have not achieved their success criteria (e.g., supplemental irrigation).
- Implement measures through the Adaptive Management Program (see Chapter 7) in ways consistent with permit obligations and with the consent of the Implementing Entity.

Earthquakes

Earthquakes of less the 4.0 on the Richter scale (defined as "micro" or "minor" earthquakes by the USGS) occur frequently in the study area and their effects on natural communities and covered species are expected to be very small or undetectable. While less common, earthquakes defined as "light" (magnitude 4.0 to 4.9) or "moderate" (5.0 to 5.9) are expected to have little to no effect on covered species or natural communities[11]. However, these earthquakes may be large enough to cause moderate ground shaking which may trigger small to moderate-sized landslides. These landslides are a natural part of the ecosystems in the study area. Damage to Reserve System facilities from such light to moderate earthquakes is expected to be low to none.

A large, catastrophic earthquake is typically defined in planning documents and engineering projects as having a magnitude equal to or greater than 6.7[12]. This magnitude earthquake has the potential to occur during the permit term in or near the study area. The USGS predicts that an earthquake of magnitude 6.7 or greater has a 7% chance of occurring by 2036 on the Calaveras Fault, which extends down the eastern side of the study area in the foothills of the Diablo

[11] Earthquakes of magnitude 6.0 to 6.6 are not specifically defined by the USGS.
[12] Source: <http://earthquake.usgs.gov/regional/nca/wg02/index.php>. For reference, the Northridge earthquake of 1994 was a magnitude 6.7.

Range[13]. The Hayward Fault to the north of the study area has a 31% chance of an earthquake of this magnitude by 2036. The San Andreas Fault, which runs down the western side of the study area through the Santa Cruz Mountains, has a 21% chance of a similar event. Earthquakes of every magnitude described above could occur in or near the study area during the permit term and are therefore considered changed circumstances.

The negative effects of a catastrophic earthquake are likely to manifest mostly as damage to infrastructure (i.e., fencing, bridges, buildings, temporary irrigation) rather than to natural communities or species. Should any earthquake occur, the Implementing Entity will rebuild Reserve System infrastructure and conduct *post hoc* monitoring of species or populations that are identified as being potentially negatively affected by the incident. Reserve System infrastructure will be repaired or rebuilt within two years. Remediation of enhancement, creation, and restoration sites within the Reserve System affected by earthquakes during the permit term (i.e., as a result of landslides) would be remediated within two years of the earthquake. Site-specific covered species and natural community monitoring will be conducted for three years after the event if covered species or their habitats are adversely affected.

Damage to Reserve System infrastructure, natural communities, and covered species from any earthquake will be remediated by the Implementing Entity.

10.2.2 Federal No Surprises

The federal *No Surprises Regulation* was established by the Secretary of the Interior on March 25, 1998. It provides assurances to Section 10 permit holders that no additional money, commitments, or restrictions of land or water will be required should unforeseen circumstances requiring additional mitigation arise once the permit is in place. The No Surprises Regulation states that if a Permittee is properly implementing an HCP that has been approved by USFWS and/or NMFS, no additional commitment of resources, beyond that already specified in the plan, will be required.

The Permittees request regulatory assurances (No Surprises) for all covered species in the Plan. In accordance with No Surprises, the Permittees will be responsible for implementing and funding remedial measures in response to any changed circumstances as described in this chapter. The Permittees will not be obligated to address unforeseen circumstances but will work with the Wildlife Agencies to address them within the funding and other constraints of the Plan should they occur.

The Permittees understand that No Surprises assurances are contingent on the proper implementation of the permits, Implementation Agreement, and Habitat Plan. The Permittees also understand that USFWS may suspend or revoke the federal permit, in whole or in part, in accordance with federal regulations

[13] Source: <http://earthquake.usgs.gov/regional/nca/ucerf/>. The Calaveras Fault runs immediately east of Coyote Ridge in a line traced by the locations of Anderson, Coyote, and Calaveras Reservoirs.

(50 CFR Section 13.27 and 13.28 and other applicable laws and regulations) in force at the time of such suspension.

10.2.3 Federal Section 7 Consultations

An important goal of the Plan is to provide a framework for ESA compliance for covered species for all covered activities in the study area. Whether a covered activity occurs under Section 7 or 10 of the ESA, the Habitat Plan will provide the framework for future Section 7 consultations. For some future projects, ESA consultation (through Section 7) will still be required even after the Plan is complete (e.g., SCVWD flood control projects or private development projects that require a Corps wetlands permit). As such, the consultation process must be taken into account when developing a project timeline.

Projects that are subject to Section 7 of the ESA are evaluated under different standards than projects subject to Section 10. Non-federal projects must obtain a permit for take of listed species, while federal agencies must consult with USFWS or NMFS whenever their actions have the potential to affect a listed species. For example, the definition of "affect" differs slightly from that of "take" and may be applied differently, depending on the species and the project.

The Habitat Plan is not intended to alter the obligation of another federal agency to consult USFWS or NMFS pursuant to Section 7 of the ESA. Unless otherwise required by law or regulation, USFWS will ensure that biological opinions issued for projects that are defined as covered activities under the Habitat Plan are consistent with the biological opinion issued for the Habitat Plan and the federal permit. Section 7 consultations only apply to federally listed species, so only those covered species that are federally listed at the time of the consultation need be included in the consultation. Unless otherwise required by law or regulation, USFWS will not impose measures on applicants for coverage under the Habitat Plan in excess of those that have been or will be required by the Implementing Agreement, the Habitat Plan, and the permits. Before completing a Section 7 consultation for a covered activity in which USFWS proposes to require a measure in excess of the requirements of the Implementing Agreement, the Habitat Plan, or the permits, USFWS will meet and confer with the Permittee with jurisdiction over the affected project to discuss alternatives to the imposition of the measures that would meet the applicable legal or regulatory requirements. No Surprises assurances cannot be provided to federal agencies through the Section 7 process (50 CFR Section 17.22(b)(5)). USFWS will process subsequent ESA consultations for covered activities in accordance with the established regulatory process and deadlines (50 CFR Section 402.14).

10.2.4 State NCCP Assurances

The NCCP Act (Section 2820[f]) includes provisions ensuring that "if there are unforeseen circumstances, additional land, water, or financial compensation or restrictions on the use of land, water, or other natural resources shall not be

required without the consent of the plan participants..." The NCCPA specifies that assurances for plan participants may be provided commensurate with long-term conservation assurances and associated implementation measures provided in the Habitat Plan. CDFG's determination of the level of assurances and the time limits specified in the Implementing Agreement will be based on the overall knowledge of the species and natural communities, the strength of the conservation strategy, and the size and duration of the Habitat Plan (Sections 2820[f][1][A–H]).

The Permittees understand that No Surprises assurances are contingent on full implementation of the Habitat Plan. The Permittees also understand that CDFG may suspend the state permit, in whole or in part, in the event of any material violation of the state permit or material breach of the Implementing Agreement by the Permittees. See the Implementing Agreement Section 16 for additional information on permit suspension including steps that must be followed prior to permit suspension.

10.2.5 Conservation Contributions by State and Federal Agencies

It is anticipated that state and federal agencies, including the Wildlife Agencies, will contribute to the conservation portion of the Plan. The Permittees recognize that state and federal funds cannot be guaranteed in advance of the approval of yearly budgets, nor can they be guaranteed by agency staff who do not have the authority to commit these funds. However, the Permittees seek assurance that the Wildlife Agencies will make every effort to assist the Implementing Entity in securing the funding outlined in Chapter 9 to contribute to species recovery and to help implement the conservation portion of the Habitat Plan.

10.2.6 Staff Contributions by State and Federal Agencies

Successful implementation of the Habitat Plan relies on the continued participation and feedback of representatives of the Wildlife Agencies. As described in Chapter 8, Wildlife Agency staff are expected to participate in Implementing Entity meetings and subcommittees as needed to evaluate and provide advice and applicable consent on Plan implementation. In particular, Wildlife Agency staff participation is critical to the success of the adaptive management and monitoring program. The Permittees request that the Wildlife Agencies make every effort, given budget and workload constraints, to provide staff to serve on all appropriate committees and participate in discussions and meetings to ensure that the implementation of the Habitat Plan is consistent with any findings upon which the permits are based.

10.2.7 Assurances for Private Landowners

Take Authorization Assurances

Project proponents will receive take authorization for covered activities according to the procedures and requirements described in the Plan (see Chapter 6, Section 6.3 *Conditions on All Covered Activities* and Chapter 8, Section 8.7 *Roles and Responsibilities in Reviewing Applications for Take Authorization*). Take authorization is granted under a single non-severable permit. If the USFWS or CDFG suspend or revoke their permit, take authorization provided to those under the jurisdiction of the Permittees would also be suspended or revoked. As such, for projects conducted by private developers under the jurisdiction of one of the Permittees, take authorization will remain in effect for that covered activity unless one or more of the permits issued by the Wildlife Agencies to the Permittees are suspended or revoked. In addition, if a local jurisdiction determines that one of its project proponents is in violation of their permit (i.e., in violation of the conditions in Chapter 6), the local jurisdiction will suspend or revoke take coverage extended to the project proponent and report the violation to the Implementing Entity. The Implementing Entity will report the violation to the Wildlife Agencies immediately.

Neighboring Landowner Assurances

This Habitat Plan calls for the acquisition of land and coordinated management of a Reserve System for the benefit of covered species. As a result of the conservation strategy (Chapter 5), some populations of listed species are expected to increase in the reserves and elsewhere. Landowners adjacent to or near reserves may be concerned that populations of state- or federally listed species in the reserves may expand and colonize or use their lands, potentially restricting their land use activities. The Neighboring Landowner assurances included in this Plan are designed to address these concerns.

Active private ranches, cropland, pasture, orchards, and vineyards are the most abundant land uses in Santa Clara County outside of the urban centers. These are the land uses that are also most likely to occur adjacent to reserve lands. Land uses outside urban areas that are most likely to be affected by the presence or increased abundance of covered species are limited to actively farmed lands such as crops, pasture, orchards, or vineyards in which heavy equipment is used regularly and the soil is regularly disturbed. Routine ranching activities (e.g., livestock grazing on annual grassland) are not expected to be affected by the maintenance or increase of populations of covered species on nearby reserve lands. Most routine ranching activities have little or no adverse impact on the terrestrial covered species and in some cases may benefit them[14]. Other land uses (e.g., urban development) are excluded from Neighboring Landowner protections

[14] Special federal rules (called "4(d) rules") exempt defined routine ranching activities from take prohibitions of California red-legged frog and California tiger salamander.

because ongoing take of covered species is not expected to occur within these areas.

Neighboring Landowner Assurances are extended to certain "farmlands" as defined below. For purposes of the Neighboring Landowner Agreement program, *farmlands* means lands on which normal agricultural practices including but not limited to crop planting and production, irrigation and fertilization, soil tilling, crop harvesting, grazing including intensive livestock grazing, forage production, animal production and husbandry, and other associated activities such as fence construction and maintenance, vehicle or horse use, and construction and maintenance of typical farm outbuildings.

Take coverage for this program is limited to three covered species: California red-legged frog, California tiger salamander, and western pond turtle. By providing Neighboring Landowner Assurances, the Habitat Plan acknowledges that successful implementation of the conservation strategy (e.g., specific management actions that benefit species) may cause the three species listed above to become established on or use nearby private lands. Take coverage afforded by Neighboring Landowner Assurances could result in a diminution of the benefits of the conservation strategy for these three species in instances where species expand or increase their populations within the study area. Neighboring Landowner Assurances do not provide for take of existing populations at the time baseline conditions are documented. Accordingly, this program would not reduce these populations or habitat from baseline conditions. In addition, these assurances end when the permit term expires.

Neighboring Landowner Assurances provide incidental take coverage for California red-legged frog, California tiger salamander, and western pond turtle on all private farmlands, within 1.0 mile of the boundary of any land or property acquired or placed under easement by the Implementing Entity or by another organization in partnership with the Implementing Entity for the Reserve System. A one mile buffer was determined to account for the most likely dispersal distances of California tiger salamander and California red-legged frog (e.g., dispersal distance of from breeding habitat into upland habitat). Covered species are expected to disperse or move more than 1.0 mile but this radius accounts for the most likely area of effect into neighboring lands.

Once land acquisition is complete (by Year 45 of the Plan), the lands eligible for these assurances are estimated at 20,395 acres (4% of the study area) if all lands currently in agricultural use remain in agricultural use. The impact analysis assumes that total of 8,018 acres of cultivated agricultural land in the study area will be removed by covered activities (**Table 4-2**). Applying this assumption reduces the estimated eligible land to 12,377 acres (2% of the study area) by the end of the permit term. Because the actual pattern of agricultural land conversion is difficult to predict, these two values represent a likely range of eligible land (rounded to 12,400 acres to 20,400 acres). Modeled habitat for the three species is found on these sites, but mostly for secondary or dispersal habitat, not breeding habitat (**Table 10-3**). Modeled habitat for the three species also overlap with each other.

Privately held lands will be included in this Neighboring Landowner Assurances program through a voluntary application process. The neighboring landowner would apply to the Implementing Entity for coverage and the Implementing Entity would determine whether the lands in question qualified and, if they did, issue a *Certificate of Inclusion* for the property that will be signed by the landowner. The approach is required by the Wildlife Agencies to allow an affirmative statement be made by willing landowners to participate in the Habitat Plan. Those landowners that do not seek to participate will not be required to do so but will also not receive coverage for incidental take for their ongoing activities as a result of Habitat Plan conservation actions. Neighboring land agreements can only extend take coverage to eligible parcels or portions of parcels[15] within the permit area (i.e., not adjacent counties or portions of Santa Clara County that are outside of the permit area). Based on the landowner participation in other counties with approved HCPs that have similar programs (e.g., San Joaquin County), it is assumed that up to 10% of eligible lands will enter into neighboring land agreements, or no more than 1,240 to 2,040 acres.

The neighboring landowner protections listed below will be offered under the Plan according to the definitions and process defined below.

- Farmlands (as defined above) within 1.0 mile of reserve boundaries may be covered for incidental take of California red-legged frog, California tiger salamander, and western pond turtle authorized for take under the Habitat Plan's associated Section 10(a)(1)(B) and NCCP permits, should any such lands support increased use or become inhabited by these three covered species *after* establishment of a reserve parcel within 1.0 mile. Take coverage will not be provided for individuals or populations of these three covered species that inhabit the neighboring lands prior to the establishment of a reserve parcel, as identified in a baseline survey (see below).
- Coverage under the take permits will be offered to neighboring lands actively being used for farming purposes at the time that the reserve is established within 1.0 mile.
- *Actively being used for* means lands on which usual and customary agricultural practices are occurring, including normal crop rotation practices, at the time the neighboring reserve is established. For example, if agricultural lands that are used for crop production lie fallow in accordance with normal crop-rotation practices at the time the neighboring reserve is established, those lands would be considered to be actively used for farming purposes. Such coverage shall continue, subject to the terms and conditions of the Habitat Plan, the Implementing Agreement, and the take permits, for as long as the neighboring lands are actively being used for farming purposes and the permits remain in effect.
- Coverage will not be offered to neighboring lands devoted to non-farmland purposes at the time the nearby reserve is established. Take coverage does not include conversion of agriculture to other uses.

[15] Landowners with parcels that lie partly within the permit area or partly within the 1.0 mile eligible radius may enroll only that eligible portion of their parcel in the Neighboring Landowner Assurances program.

- A change in agricultural land cover as defined by the land cover types in this Habitat Plan (e.g., pasture to vineyard) would require landowners reapplying to the Implementing Entity for Neighboring Landowner Assurances in order to determine the new baseline condition of covered species on the affected property.
- Prior to receiving coverage under the permits, the environmental baseline must be determined. The baseline conditions on a site will be documented to define the type, number, location, and condition of California red-legged frog, California tiger salamander, and western pond turtle or their habitat present on the site prior to the acquisition or management of reserve lands within 1.0 mile of the site. The final baseline report will document the areas and resources of the neighboring parcel eligible for take authorization under this program. Landowners will have the option of either allowing biologists with the Implementing Entity to survey their property and reimbursing these costs, or hiring a biologist on their own that is approved by the Implementing Entity to do so. Survey costs associated with participation in this program are the responsibility of the landowner. Reports prepared by landowner consultants will be reviewed by the Implementing Entity for adequacy. Neighboring Landowner Assurances do not provide for take of existing populations and already occupied habitat of listed species (i.e., the baseline conditions). Accordingly, this program would not provide coverage for a decline in baseline conditions.
- The survey report will address the areas proposed for Neighboring Landowner protections and will include, at a minimum, a description of habitat for covered species (extent and quality), existing records of covered species within 1 mile of the parcel proposed for coverage, and the results of surveys for covered species on the parcel proposed for coverage. Upon receipt of a biological report approved by the Implementing Entity and a *Certificate of Inclusion* signed by the landowner, the Implementing Entity will grant take coverage to the landowner under this program.
- A change in ownership of land enrolled in the Neighboring Landowner Assurances program requires the new landowner to notify the Implementing Entity in order to continue coverage. This notification allows the Implementing Entity to verify that the new landowner wishes to continue to be enrolled in the program. No new surveys are required to continue coverage under the program, if agricultural land cover documented in the original Neighboring Landowner Agreement is maintained by the new owner. However, the new land owner would have to sign a Certificate of Inclusion for the property.

The Implementing Entity will maintain a record of all correspondence and certificates of inclusion sent to neighboring landowners subject to these protections, as well as signed certificates of inclusion returned by landowners. The Implementing Entity will notify the Wildlife Agencies of the number, location, and size of neighboring lands entered into the program in its annual report. Copies of the certificates will be provided to the Wildlife Agencies upon request. The location of all neighboring lands enrolled in the program will be mapped in the Implementing Entity's GIS database.

As the Reserve System grows, the Implementing Entity will include an outreach component to educate neighbors on how to continue their agricultural practices to minimize effects to species (and to benefit species) and inform land owners about the Neighboring Landowner Assurances program and provide ongoing education for those enrolled in the program.

Public Access to Conservation Easements Held by Private Landowners

It is not the intent of the Implementing Entity to allow general public access on conservation easements that are part of the Habitat Plan Reserve System. Public access to private lands managed under the Habitat Plan could conflict with ongoing agricultural or other operations and could pose a safety risk to the public. Public access to lands under conservation easements could also pose a risk of unwanted trespass onto adjacent privately held lands. Generally, the Implementing Entity will leave decisions regarding public access up to the landowner but will restrict access through the conservation easement where that access may conflict with the conservation goals of the site (see Chapter 8, Section 8.6.3 *Conservation Easements*). All conservation easements will provide access for the Wildlife Agencies' and Implementing Entity's biologists to conduct management and biological monitoring necessary for compliance with the Habitat Plan's adaptive management and biological monitoring program.

10.3 Modifications to the Plan

The Habitat Plan or incidental take permits can be modified in accordance with USFWS and CDFG regulations and the terms of the Implementing Agreement. Habitat Plan modifications are not anticipated on a regular basis. Modifications can be requested by a Permittee or by the permitting agencies. The categories of modification that are recognized, in order of significance, are administrative changes, minor modifications, and amendments, each of which is described below.

10.3.1 Administrative Changes

Administrative changes are internal changes or corrections to the Plan that do not require preauthorization from the Wildlife Agencies. Administrative changes do not result in any changes to the impacts analysis, conservation strategy, or decision documents. Administrative changes will be made in writing and documented by the Implementing Entity. The Wildlife Agencies will be provided a summary of administrative changes in each annual report. Examples of administrative changes are listed below.

- Corrections of errors in the Plan that do not change the intended meaning or obligations.

- Day-to-day implementation decisions, such as modifying irrigation schedules for created/restored habitats on the basis of observed water needs of planted vegetation.
- Conducting additional monitoring surveys.
- Modifying Habitat Plan monitoring protocols to align with Wildlife Agency monitoring protocols as they may be modified in the future.
- Adopting new monitoring protocols that may be promulgated by the Wildlife Agencies in the future.
- Annual adjustments to the Habitat Plan development fee and wetland fees to keep pace with the inflation of land values.
- Changes to the membership of the Governing Board, Implementation Board, the Science Advisors, or any advisory committees to the Board without changing the representation of the Permittees, agencies, or organizations.

10.3.2 Minor Modification

Minor modifications to the Plan are changes that do not adversely affect the impact assessment or conservation strategy described in the Habitat Plan and do not adversely affect the ability of the Implementing Entity to achieve the conservation strategy commitments of the Habitat Plan. Minor modifications do not require an amendment to the permits or the Implementing Agreement, but they do require pre-approval by the Wildlife Agencies before being implemented. In addition, minor modifications do not change the scope or nature of the covered activities and do not trigger a new NEPA analysis. Examples of minor modifications are listed below.

- Updates to the land cover map or to species occurrence data that are consistent with the predictions and expectations of the Habitat Plan.
- Modifying the design of directed studies or implementing new studies.
- Minor changes to the biological goals or objectives in response to adaptive management.
- Minor changes to survey or monitoring protocols that are not proposed in response to adaptive management[16].
- Modification of monitoring protocols for Habitat Plan effectiveness not in response to changes in standardized monitoring protocols from the Wildlife Agencies.
- Modification of existing or adoption of additional conservation measures that improve the likelihood of achieving covered species objectives.

[16] Such changes are subject to federal No Surprises regulations, state assurances, and local assurance provisions found in the Implementing Agreement.

- Discontinuation of ineffective conservation measures and adoption of new conservation measures that improve the likelihood of achieving the conservation strategy.
- Modification of existing or adoption of new performance indicators or standards if results of monitoring and research or new information, indicate that the initial performance indicators or standards need revision.
- Modification of existing or adoption of additional covered species or natural community objectives where such changes more effectively achieve covered species, natural community, and overall Habitat Plan goals.
- Modification of the conditions on covered activities in response to adaptive management.
- A minor change to the conservation strategy restoration/creation interim deadlines (**Table 5-14**) (e.g., extend a deadline by up to 2 years, if compliance has almost been accomplished and can be documented by the Implementing Entity).
- Minor changes to the reporting protocol.
- Other changes that do not result in adverse effects on covered species beyond those analyzed in the Habitat Plan and the associated biological opinion, and do not limit the ability of the Implementing Entity to achieve the biological goals and objectives of the Plan.

Changes in the land acquisition configuration of the Plan (see Chapter 5, Section 5.3.1 *Land Acquisition and Restoration Actions*) may be necessary to address changing land use patterns, such as rural development, in the study area or a lack of willing sellers in key Conservation Analysis Zones (Zone). Changes in land acquisition requirements within a Zone that amount to less than 5% of the original acreage are considered minor modifications as long as all three of the conditions listed below are met.

- The overall target acquisition acreage of land cover type or habitat for covered species does not change within the study area (i.e., a decrease in land acquisition on one Zone is balanced by an increase in land acquisition in another Zone).
- The changes between Zones are biologically equivalent or biologically superior to the original Plan.
- The changes do not affect the ability of the Implementing Entity to mitigate the impacts on covered species, contribute to the recovery of covered species, and meet the Plan's biological goals and objectives.

These are considered minor adjustments to account for willing sellers whose parcels span more than one Zone and may shift land cover between Zones while still meeting overall land cover requirements. A minor change in land acquisition configuration may be needed, for example, to account for small differences in acreages of land cover type across Zones due to parcel boundary changes or spanning across multiple Zones. In addition, this allowance is also important to account for limitations in the land cover mapping where a parcel

may contain important biological resources that were missed in the mapping but identified in the field. Finally, rural development occurring in one Zone may limit the acquisition opportunities of land cover types with limited occurrences within the Zone. This may make the same land cover type in an adjacent Zone a more attractive acquisition option. Any change in land acquisition requirements that exceeds 5% of the original acreage requirement or that is inconsistent with the criteria above is considered an amendment.

A change in the Habitat Plan study area (either a decrease or an increase) in response to a change in the planning limit of urban growth or city limit is also considered a minor modification, as long as the change meets the five conditions listed below.

- There is no change in the permit area.
- It is compatible with the conservation goals and Reserve System configuration of the Plan.
- It is consistent with the urban development covered activities in the Plan as defined in Chapter 2.
- It is consistent with the impact analysis of the Plan (Chapter 4).
- It addresses activities that are already covered by the Plan.

Minor Modification Process for Section 10(a)(1)(B) Permit

Minor modifications to the federal permit may be proposed by one or more Permittees, the Implementing Entity, or the USFWS. While the USFWS does not have the right to amend its own permit unilaterally, they may propose minor modifications to the Permittees for consideration. Minor modifications shall take the form of a proposal that includes the following elements:

- Description of proposed minor modification.
- Rationale for proposed minor modification.
- Analysis of the environmental effects of the proposed minor modification, including impacts to covered species and implications for the conservation strategy.
- Description and declaration of how the proposed minor modification conforms to the conditions disclosed above (i.e., compatible with conservation goals) and the terms of the Plan as it was originally adopted.

All minor modifications must first be approved by the Implementing Entity Governing Board in a public meeting, and are subject to final approval by the Wildlife Agencies. To modify the Plan without amending the permits, the Implementing Entity Governing Board will submit to the Wildlife Agencies a written description of the proposed change and an explanation of why its effects are not believed to be significantly different from those described in the original Plan.

Upon receiving the proposal for a minor modification, the Wildlife Agencies may authorize the modification, request addition information, or deny the modification. If the Wildlife Agencies concur with the proposal, they will authorize the modification in writing, and the modification shall be considered effective on the date of the Wildlife Agencies' written authorization. If the Wildlife Agencies feel that the proposal lacks specific information, the Wildlife agencies may request additional information in order to authorize or deny the modification. If the Wildlife Agencies deny the modification, they will provide explanation for the denial.

The Wildlife Agencies will not approve minor modifications to the Plan if they determine that the modifications would result in adverse effects on covered species or natural communities that are significantly different from those analyzed in the Plan. If any Wildlife Agency denies a proposed modification, it may be proposed as an amendment as described below.

Minor Modification Process for NCCP Act Permit

There is no established procedure to amend an NCCP Act permit through a minor modification. However, the minor modification process described above for the federal permit is proposed to also apply to the NCCP Act permit. The Implementing Entity will submit the same proposal to CDFG as to USFWS. CDFG will review the proposal and choose to accept the proposal, request additional information, deny the proposal, or require that the modification be processed as an amendment, as described below.

10.3.3 Amendments

An amendment is a change in the Plan that may affect the impact analysis or conservation strategy in the Plan. Amendments to the Habitat Plan and the incidental take permits follow the same formal review process as the original Plan and permits, including NEPA/CEQA review, Federal Register notices, an internal Section 7 consultation with USFWS, and formal NCCP findings by CDFG. An internal Section 7 consultation with NMFS would be required if anadromous fish are added to the Plan. The Implementing Entity's Implementing Board will submit a proposed amendment to the Wildlife Agencies in a report that includes a description of the need for the amendment, an assessment of its impacts, and any alternatives by which the objectives of the proposal might be achieved.

Examples of changes that would require an amendment include but are not limited to those listed below.

- Revisions of the permit area boundary.
- Addition of species to the covered species list.

- Increasing the allowable take limit of existing covered activities or adding new covered activities to the Plan.
- Modifications of any important action or component of the conservation strategy under the Habitat Plan, including funding, that may substantially affect levels of authorized take, effects of the covered activities, or the nature or scope of the conservation program. This includes a reduction in the conservation strategy in the event that covered activities and fee funding do not occur as expected (see below for additional explanation).
- A major change to a conservation strategy milestone (e.g., extend a deadline beyond one or two years).
- A major change in biological goals and objectives or conservation measures if monitoring or research indicates that they are not attainable because technologies to attain them are either unavailable or infeasible.
- Extending the permit term beyond 50 years.
- Increasing the land acquisition requirements in excess of 5% of the original acreage requirement.

As described in Chapter 9, it is possible that, even over the full 50-year term of the permits, covered activities and authorized take might not occur to the extent projected in the Plan. If this occurs, fee revenues would likely fall short of projections. A shortfall of fee revenues could make it difficult or impossible for the Implementing Entity to complete the Reserve System, habitat restoration and creation requirements, and other components of the conservation strategy within the milestones described in Chapter 5 and Chapter 8, Section 8.12 *Schedule and Milestones* and within term of the permits. If this situation appears likely, the Permittees and the Wildlife Agencies will meet and confer to develop mutually agreeable terms, which could include, but are not limited to, the following:

- extend the term of the permits to allow completion of the conservation strategy, or
- reduce the amount of take authorized and reduce the conservation obligations of the Permittees.

Amendment Process for the Section 10(a)(1)(B) Permits

To amend the Section 10(a)(1)(B) permits, the Implementing Entity Governing Board will submit a formal application to USFWS (or to NMFS if anadromous fish are proposed to be added to the Plan). This application must include a revised Habitat Plan, a permit application form, any required fees, a revised Implementing Agreement, and the required compliance document under NEPA. The appropriate NEPA compliance process and document will depend on the nature of the amendment being proposed. A new scoping process may be required, dependent upon the nature of the amendment. If additional scoping is deemed appropriate and necessary, USFWS and/or NMFS will publish a Notice of Intent in the Federal Register to initiate the scoping process. Upon submission of a completed application package, USFWS and/or NMFS will publish a notice

of the proposed application in the Federal Register, initiating the NEPA and HCP amendment review process. After public comment, USFWS or NMFS may approve or deny the permit amendment application.

Amending the NCCP Permit

Procedures for applying for an amendment to the NCCP permit are included in the Implementing Agreement and will be processed in accordance with applicable NCCP Act requirements. The NCCP permit amendment will be subject to the requirements of CEQA, including a public review period. At the conclusion of the public review period, CDFG will either approve or deny the permit amendment. To approve the permit amendment, CDFG must make appropriate NCCP Act and CEQA findings.

Amendment Guidelines for Pacheco Dam Reconstruction and Reservoir Enlargement Project

This section provides guidance for an amendment of the Habitat Plan to add the Pacheco Dam Reconstruction and Reservoir Enlargement project as a covered activity. This project is currently not a covered activity in the Plan (see Chapter 2) because it will take water from the Central Valley Project operated by the Bureau of Reclamation. A project description of the Pacheco Dam Reconstruction and Reservoir Enlargement Project adequate to complete an impacts analysis was also not available at the time of permit issuance for this Plan. Therefore, the permits for this Plan do not authorize take associated with this project. However, if SCVWD proceeds with this project, incidental take authorization could be obtained through an amendment of this Plan. Whether this Plan is amended to cover this project or not, the conservation strategy for the Pacheco Dam Reconstruction and Reservoir Enlargement Project will be consistent with the conservation strategy in this Plan.

If take authorization for this project is obtained through an amendment of the Habitat Plan the Permittees must follow all of the general requirements described above for amendments. To compensate for the additional impacts, the amendment must supplement the operating conservation strategy of this Plan.

The SCVWD will provide adequate funding to implement the modified conservation strategy and is expected to own and operate the expanded reservoir. Preserved lands will be enhanced, managed, and monitored consistent with the conservation strategy and monitoring and adaptive management program of this Plan. Land management and monitoring may be conducted by the Implementing Entity, SCVWD, or another Permittee.

The Wildlife Agencies have not provided assurances to accepting the specific terms of this amendment and will base their determination of whether or not to approve an amendment based on the conditions and analysis available at the time of application.

Table 10-1. Thresholds and Remedial Actions for Changed and Unforeseen Circumstances Addressed by the Plan

	Thresholds			
Circumstance	**Changed (Funded)**	**Changed (Unfunded)**	**Unforeseen (Unfunded)**	**Remedial Actions**
Covered Species Listed	• Covered species listed	• N/A	• N/A	• No changes to the terms and conditions of the Implementing Agreement or modifications to conservation measures are required.
Non-covered species listed	• Non-covered species listed	• N/A	• N/A	• Evaluate potential impacts of covered activities on the newly listed species, including an assessment of the presence of suitable habitat in impact areas. • Develop measures to fully avoid impacts on the newly listed species until the Plan is amended to cover the species or comply with ESA and CESA via other means (i.e., individual Section 7 consultations, consistency determinations).
Global Climate Change	• Increase in temperature of up to 2.8°C for any of the three baseline periods measured as a 10-year running average	• N/A	• increase in temperature greater than 2.8°C for any of the three baseline periods measured as a 10-year running average	• Enhance monitoring to detect ecological responses to climate change (see Chapter 7). • Identify target species most vulnerable to climate change and increase status-and-trend monitoring for those species. • Alter conceptual ecological models for natural communities and covered species as a tool to devise improved management actions (see Chapter 7). • Alter or conduct more intensive management actions on target/vulnerable species to facilitate shifts in species distribution (e.g., more active population management of covered species). • Conduct more aggressive control of invasive species that respond positively to climate change. • Implement other measures through the Adaptive Management Program (see Chapter 7) in ways consistent with permit obligations and with the consent of the Implementing Entity.
Fire	• A single fire burning 2,235-7,599 acres in the Reserve System • Any number of fires of any size that impact enhancement, restoration or creation projects[1]	• N/A	• A single fire exceeding 7,599 acres in the Reserve System • More than one fire in the Reserve System burning an excess of 7,599 acres • Burned areas not containing enhancement,	• Initiate a post-fire damage assessment within six months following the end of a fire in order to identify the appropriate post-fire restoration and rehabilitation actions. • Initiate the appropriate actions, such as habitat restoration, invasive-species control and/or erosion control, in affected reserves to ensure the reestablishment of covered plants and other native vegetation through active or passive means, as appropriate, within one year post-fire.

[1] For any individual fire exceeding 7,599 acres, remedial actions would be limited to enhancement, restoration and/or creation project sites (i.e., the entire burned area would not be subject to remedial actions).

	Thresholds			
Circumstance	**Changed (Funded)**	**Changed (Unfunded)**	**Unforeseen (Unfunded)**	**Remedial Actions**
			restoration or creation projects	• Implement measures through the Adaptive Management Program (see Chapter 7) in ways consistent with permit obligations and with the consent of the Implementing Entity. • Ensure erosion control measures are in place prior to the next rainy season.

	• Any number of fires, regardless of size, in the same area of the Reserve System at the following frequencies (see **Table 10-2**)
	  • Grasslands: ≥5 years
	  • Chaparral/coastal scrub: ≥5 years
	  • Oak woodland: ≥10 years
	  • Riparian: ≥25 years
	  • Confer woodland: ≥5 years
	  • Wetland: ≥5 years
	• Any number non-catastrophic fires of any size that impacts restoration or creation projects
		• N/A	• Wildfires that reoccur in the same location below the threshold identified in **Table 10-2**	

Nonnative Species or Disease	• Infestations of new diseases or new nonnative invasive species affecting up to 25% of a predominant natural community (i.e., oak woodland) or covered species within the Reserve System at any given time	• Infestations of new diseases or new nonnative invasive species affecting more than 25% of a predominant natural community (i.e., oak woodland) or covered species within the Reserve System	• N/A	• Determine the best method for measurement and tracking extent within 3 months of detection. • Prepare a damage-assessment report within 6 months of detection. • Recommend and plan actions to address the threat within 6 months of detection. • Respond through adaptive management in ways consistent with permit obligations and with the consent of the Wildlife Agencies within one year of detection.
	• Spread of existing nonnative species or diseases up to 25% above current conditions within the Reserve System at any given time	• Spread of existing nonnative species or diseases more than 25% above current conditions within the Reserve System	• N/A	

	Thresholds			
Circumstance	**Changed (Funded)**	**Changed (Unfunded)**	**Unforeseen (Unfunded)**	**Remedial Actions**
Flooding	• All flood events that damage or destroy enhancement projects, restoration projects, creation projects, or in-stream conservation structures	• N/A	• N/A	• Evaluate site to determine appropriate corrective actions necessary to restore the habitat through active management or natural processes. • Implement appropriate corrective actions (i.e., grading, new riparian plantings, debris removal, covered plant restoration, etc.) within a time period to maintain permit compliance with the Stay-Ahead provision for restoration, creation, and enhancement.
Drought	• Up to 7 droughts of one to eight years each, of which, only a single drought is expected to last up to 8 successive years	• N/A	• More than 7 droughts during permit term • More than a single drought of 8 successive years • Any number of droughts lasting more than 8 successive years each	• Prepare damage assessment report within one year of damage or loss. • Identify actions to improve effects on covered species (e.g., provision of temporary artificial water sources) within one year of damage or loss. • Identify actions to improve effects on enhanced and restored habitat (e.g., supplemental irrigation) within one year of damage or loss. • Implement measures through the Adaptive Management Program (see Chapter 7) in ways consistent with the permit obligations and with the consent of the Implementing Entity within one year of damage or loss.
Earthquake	• Damage to Reserve System infrastructure, natural communities, and covered species from any number of earthquakes of any magnitude	• N/A	• N/A	• Repair or rebuild Reserve System infrastructure within 2 years of earthquake. • Remediate enhancement, restoration, and creation sites in the Reserve System that may have been affected (i.e., as a result of landslides) within 2 years of earthquake. • Conduct post hoc monitoring of species or populations that are identified as being potentially negatively affected by the incident for 3 years following the earthquake.

Table 10-2. Natural Community-Specific Fire Return Intervals

Natural Community	Fire to Return Interval[1] (Average Years)				Return Intervals (years) Defining Unforeseen Circumstance
	Classification[2]	Pre-Historic[3]	Historic[3]	Current [4]	
Grassland	Truncated short-short	1 to 2	10 to 30	25 to 35	< 5
Chaparral/coastal scrub	Truncated short-medium	1 to 2 1 to 15 10 to 35	10 to 30 20 to 30 7 to 29	25 to 35 125 to 250	< 5
Oak woodland	Truncated short-medium	1 to 2 10 to 35 30 to 135	50 to 75 10 to 30	150 to 250 25 to 35	< 10
Riparian forest and scrub	Long	–	–	Over 100 years	< 25
Conifer woodland	Short-long	135	20 to 50 4 to 12	50, 9 to 16 100 to 150	< 5
Wetland[5]	Short	1 to 2	10 to 30	25 to 35	< 5

[1] Multiple fire return intervals are stated for some of the natural communities due to variable fire return intervals stated for the land cover types within each natural community grouping. In addition, fire return intervals are highly variable for individual land cover types (e.g., redwood) depending on site specific variables (e.g., location, topographical isolation).

[2] Sugihara et al. (2006) identified six conceptual fire-return interval patterns occurring in California ecosystems. Ecosystems with a *truncated short fire return interval* experience all-area burns reoccurring at short interval. Longer return intervals for these ecosystems result in type conversion. Ecosystems with a *short fire return* interval experience large-area burns reoccurring at a short interval; however, there is a wide range including a small portion with longer intervals. Long intervals punctuated by short interval burns allow for greater complexity of non-dominate species. *Truncated medium fire-return interval* ecosystems experience a range of area burns. Upper and lower limits are defined by characteristic species life histories. Intervals outside range result in type conversion. *Medium fire-return interval* ecosystems experience area burns at medium-return intervals; however, deviation from interval does not usually result in type conversion. Ecosystems with a *truncated long fire-return interval* experience all-area burns at long intervals, typically 70 or more years; however, repeat fires within a few years or decades do not result in type conversion. *Long fire-return interval* ecosystems have long partial-area or all-area fire-return intervals. Shorter, reoccurring fires may occur in small areas without type conversion occurring.

[3] Return interval influenced by burning conducted by Native Americans (pre-historic) and Europeans (historic).

[4] Return interval influenced by fire suppression.

[5] Assumed to be the same as grassland.

Sources: Davis and Borchert 2006; Stuart and Stephens 2006; Sugihara et al. 2006; Willis 2006.

Table 10-3. Modeled Habitat for Eligible Covered Species found on Eligible Neighboring Lands[1]

	Primary Habitat	Secondary Habitat	Dispersal Habitat	Total
California red-legged frog	51 acres	0 acres[2]	17,951 acres	18,002 acres
California tiger salamander	0 acres	19,189 acres	N/A	19,189 acres
Western pond turtle	2,421 acres	12,732 acres	N/A	15,153 acres

Notes:

[1] Assumes maximum amount of land eligible for program. This analysis assumes that none of the existing cultivated agriculture eligible for the program will be lost to covered activities.

[2] Refugia habitat.

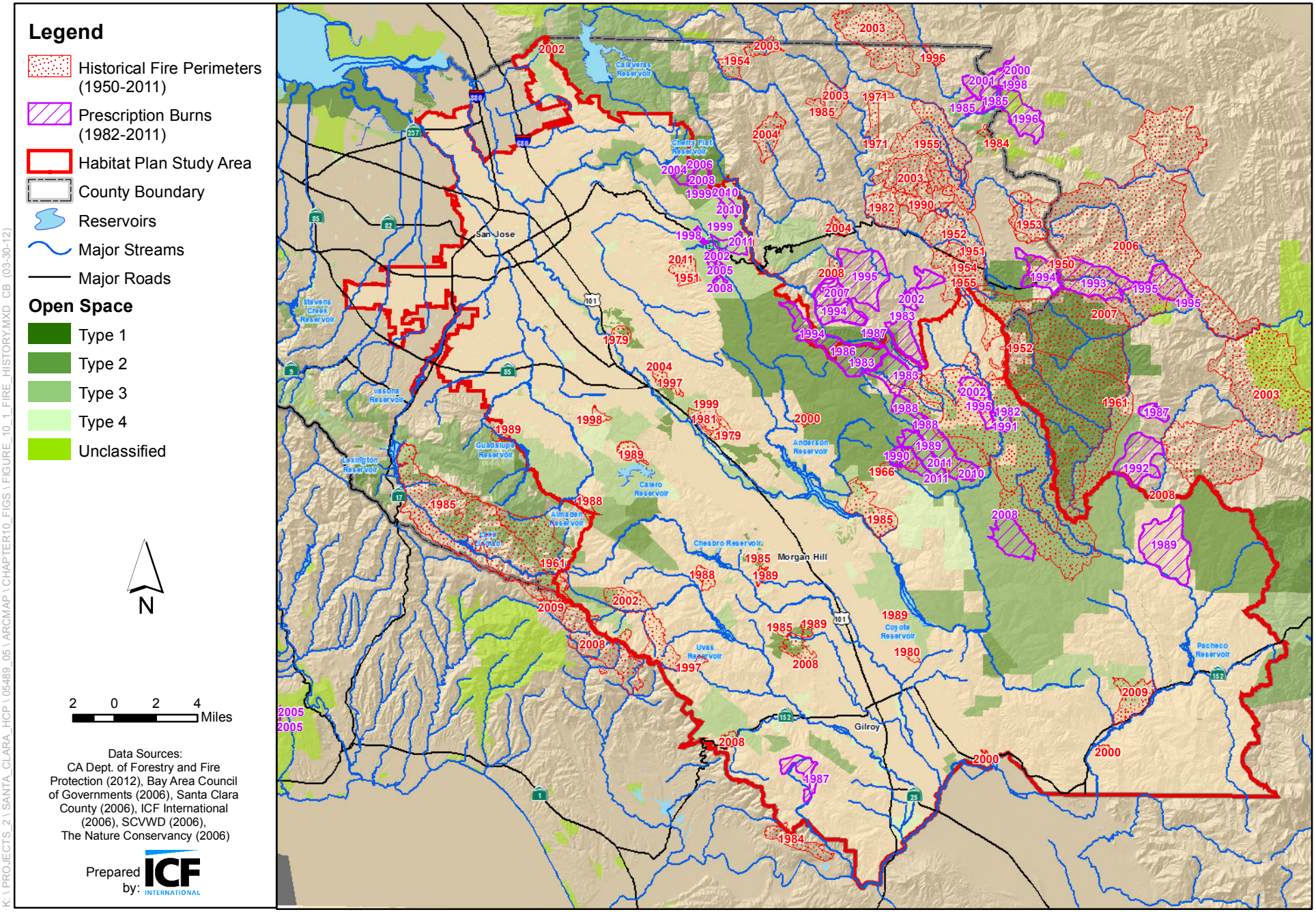

Figure 10-1

Fire History in Santa Clara County and Surrounding Areas

Chapter 11
Alternatives to Take

The ESA requires that applicants for incidental take permits specify in an HCP what alternative actions to the take were considered and the reasons why those alternatives were not selected. The *Endangered Species Consultation Handbook* (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998) identifies two alternatives commonly used in HCPs: (1) an alternative that would reduce take below levels anticipated for the proposed project and (2) an alternative that would avoid take and hence not require a permit from USFWS. The NCCP Act requires that project alternatives be considered in the EIR prepared for the NCCP (Section 2820[e]) but not in the NCCP itself.

This chapter identifies alternative measures considered that would avoid or minimize the potential for take of each wildlife species covered in this Plan. The following discussion is limited to wildlife species because the ESA requires alternatives to *take*. Take of listed plants is not prohibited by the ESA, and projects subject to Section 7 consultations will evaluate listed plants in the Biological Assessment and Biological Opinion associated with that consultation. As of the effective date of the Federal permit, take of covered species that are currently federally listed will be authorized as described in the Plan. Project alternatives are considered in more detail in the draft EIR/EIS that accompanies this draft Plan. This chapter evaluates alternatives to take for all of the wildlife species covered by the Plan:

- Bay checkerspot butterfly (threatened)
- California red-legged frog (threatened)
- California tiger salamander (threatened)
- Foothill yellow-legged frog
- Western pond turtle
- Least Bell's vireo (endangered)
- Western burrowing owl
- Tricolored blackbird
- San Joaquin kit fox (endangered)

11.1 Alternatives to Take of Bay Checkerspot Butterfly

The only known extant populations of Bay checkerspot butterfly occur within the study area. Primary impacts to this species include the expansion of urban areas or rural residential development that removes or isolates serpentine grassland habitat. These changes in land use can also increase recreational use on or limit the management of serpentine grasslands, which could also adversely affect the butterfly. Additionally, covered activities that facilitate future growth along the U.S. 101 corridor could lead to an increase in the amount of vehicle traffic and increase the rate of nitrogen deposition on serpentine grasslands in the permit area. Increased nitrogen deposition is known to change the alkalinity of serpentine soils, which reduces the competitive advantage that native plants experience in these areas, resulting in decreased abundance of the native host and larval plants of the Bay checkerspot butterfly (see discussion in Chapter 4 *Impact Assessment and Level of Take*).

Also, certain management actions for Bay checkerspot butterfly under the Plan could result in take of the species. Management actions will include livestock grazing and, in some areas, controlled burning to reduce the cover of nonnative plant species. Targeted use of herbicides, mowing, hand-weeding, or other aggressive removal techniques will be necessary in small areas to combat infestations of noxious weeds in serpentine grasslands such as barbed goatgrass. All of these actions could kill individual butterflies or their larvae. If Bay checkerspot butterflies do not disperse to new suitable habitat on their own the Implementing Entity may translocate butterflies to establish new populations in these areas, upon approval by the Wildlife Agencies. If translocation is implemented, butterfly mortality could occur during or after movement. Given these risks of mortality, one alternative is not to implement the management actions as described in the conservation strategy (see Chapter 5). This alternative is not preferred because active management is essential for the maintenance of the suitable habitat for the species. The benefits of this active management far outweigh the negative effects it may have on a small number of individuals. The management actions described in the conservation strategy will greatly benefit the species and will contribute substantially to its recovery.

An alternative prohibiting development on serpentine soils within the permit area would reduce but not eliminate take of the species, since nitrogen deposition from existing road traffic would continue to alter plant composition to the detriment of Bay checkerspot butterfly. This alternative is inconsistent with the currently adopted general plans of local jurisdictions and would therefore be infeasible.

In addition, because nonnative plants threaten to outcompete the host and nectar plants necessary for Bay checkerspot butterfly survival, some form of management is needed to maintain and increase viable habitat for the species. An alternative that eliminates take does not create a mechanism by which land is managed for the benefit of the butterfly and therefore is biologically inferior to the approach proposed by the Habitat Plan.

An alternative that limits growth or reduces traffic along the U.S. 101 corridor could reduce impacts to Bay checkerspot butterfly. However, this approach is infeasible because much of the traffic on U.S. 101 comes from outside the jurisdictions participating in this Plan. Furthermore, limiting growth along U.S. 101 is inconsistent with the approved general plans of the County and the Cities of San José, Morgan Hill and Gilroy.

In summary, implementation of this Plan is expected to provide a substantial net benefit to, and contribute to the recovery of, Bay checkerspot butterfly in the permit area. Serpentine grasslands will be protected and managed to the benefit of the species. Up to 300 acres (4%) of modeled primary habitat will be permanently affected by covered activities, but impacts would be limited to no more than 3% of the unprotected portion of each core and satellite habitat unit targeted for conservation (as defined in **Table 5-7**) with the exception of the Kirby/East Hills core unit which has a 11% allowance to accommodate the Kirby Landfill expansion (80 acres). The Reserve System will protect an estimated 3,800 acres of modeled primary habitat, all of which will be enhanced. An additional 754 acres of modeled primary habitat will be added to the Reserve System from existing open space, within which, degraded habitat will also be enhanced. This will result in a 341% increase of lands managed as primary habitat in type 1 open space and a total of 62% of existing modeled habitat preserved in type 1 open space. New reserves will ensure protection of the ranges of slopes, aspects, and microhabitats important to the species. Reserve management of habitat will enhance populations of larval host plants and adult nectar sources to allow for natural migration across reserves. These and additional management actions (see Chapter 5 *Conservation Strategy*) along with avoidance and minimization measures (see Chapter 6 *Conditions on Covered Activities and Application Process*) are expected to benefit the species in the permit area to a greater degree than any alternatives that may reduce take.

11.2 Alternatives to Take of California Red-Legged Frog

California red-legged frogs utilize several land cover types for breeding and summer refugia, including riverine habitats, seasonal wetlands, freshwater marshes, and ponds. Frogs also aestivate in a variety of upland land cover types including annual grassland and oak woodland. As a result, impacts to California red-legged frog could occur from numerous covered activities that remove aquatic or upland habitats or that temporarily disturb areas utilized by the frog. These covered activities include urban and rural development as well as implementation of in-stream capital projects, rural water-supply projects, related operations and maintenance, and, to a lesser extent, implementation of the conservation strategy.

Take of California red-legged frog could be minimized or avoided if these covered activities did not encroach on habitat for this species; fill or disturb breeding or summer refugia sites (e.g., ponds, seasonal wetlands, streams); or

remove aestivation or movement habitat connecting breeding sites. Because habitat for the species is widespread (especially upland aestivation or dispersal habitat), avoidance of all take is infeasible. Similarly, in-stream capital projects, water-supply projects and related operations and maintenance have the potential to take red-legged frogs. However, failing to carry out flood control, as well as other needed services would jeopardize human health and safety and would not be feasible.

Conservation and management actions that take place on the Reserve System, particularly those that enhance, restore, or create habitat, have the potential to take California red-legged frogs. Increasing the connectivity between breeding sites and increasing the frequency of monitoring surveys in the study area have the potential to facilitate the spread of detrimental environmental factors (e.g., chytrid fungus, nonnative predators). Although these actions could harm individual frogs, they are designed to provide a substantial net benefit to the species on the reserves. Ultimately the benefits gained from Plan implementation are expected to strongly outweigh any potential impacts or take. Under the Plan, take will be minimized or avoided through implementation of the following conditions on development discussed in Chapter 6:

- Condition 3. *Maintain Hydrologic Conditions and Protect Water Quality*.
- Condition 4. *Avoidance and Minimization for In-Stream Projects*.
- Condition 5. *Avoidance and Minimization Measures for In-Stream Operations and Maintenance*.
- Condition 11. *Stream and Riparian Setbacks*.
- Condition 12. *Wetland and Pond Avoidance and Minimization*.

Take of California red-legged frog as a result of urban development could be avoided entirely if projects did not encroach on or near habitat for red-legged frog. However, this alternative is not feasible because it is inconsistent with adopted local General Plans and fails to meet the purpose and need of the Permittees to achieve reasonable amounts of urban development and growth within their jurisdictions.

Another alternative to take from urban expansion is to require all development projects to avoid direct impacts to suitable habitat for this species. Presumably each project would be able to build on a portion of the site while setting aside the portion of the site suitable for the species. This alternative approach, however, would result in a patchwork of habitat that would not function well biologically on a regional scale because it would be interspersed with urban and rural development. In addition, this alternative would not address the indirect effects associated with development (e.g., decreased water quality, increased harm and harassment from humans and their pets). Therefore, this alternative was rejected because it would result in a biologically inferior outcome. The Plan is designed to accept a limited amount of take of red-legged frog habitat in exchange for protection, enhancement, and restoration of high-quality habitat outside urban and urbanizing areas. Most of the take will be in lower-quality habitat, although some of it will occur in higher-quality habitat as well.

Implementation of this Plan is expected to provide a net benefit to, and contribute to the recovery of, California red-legged frog in the permit area. The red-legged frog is threatened by loss of habitat and extensive fragmentation both between summer refugia and breeding sites and among wetland/pond complexes. Up to 415 acres (4%) of modeled primary habitat and 14,426 acres (4%) of secondary habitat will be affected by covered activities. The Reserve System will acquire, protect and enhance an estimated 1,300 acres of primary habitat and 30,000 acres of secondary habitat. In addition, 130 acres of primary habitat, 11,800 acres of secondary habitat will be added to the Reserve System from existing open space. Degraded habitat within existing open spaces added to the Reserve System will also be enhanced. This will result in an increase of 93% of modeled habitat in type 1 open space and a total of 26% of modeled habitat in type 1 open space. In addition to the Plan's requirements for California red-legged frog habitat acquisition, an estimated 117 acres of perennial wetlands and ponds and 10.4 miles of stream will be created or restored in the Reserve System if all impacts under the Plan occur. Some of these creation and restoration sites may be suitable habitat for the California red-legged frog. A network of core reserves will protect large blocks of breeding and non-breeding habitat. New linkages will be created in blocks of modeled habitat to facilitate dispersal and colonization throughout the study area and movement between breeding sites. Habitat management will improve quality of breeding habitat (e.g., predator eradication, woody debris and native vegetation installation, stream and riparian restoration) and upland habitat. These and additional management actions (see Chapter 5 *Conservation Strategy*) and conditions on covered activities (see Chapter 6 *Conditions on Covered Activities and Application Process*) are expected to benefit California red-legged frog in the permit area to a greater degree than any considered alternatives.

11.3 Alternatives to Take of California Tiger Salamander

California tiger salamanders utilize seasonal wetlands, marshes, and ponds during different times of the year, and upland habitat in close proximity to water habitat. Ponds and wetlands in the study area provide breeding habitat for California tiger salamander and adjacent uplands habitat accommodate year-round uses (e.g., upland refugia and dispersal).

California tiger salamander could be taken by rural development; a small portion of urban development; conversion of habitat to agriculture (e.g., vineyards); implementation of in-stream capital projects, rural water-supply capital projects and related operations and maintenance; and implementation of the conservation strategy. These projects could impact suitable breeding ponds and wetlands or suitable upland refugia. Rural development could also cause fragmentation of breeding habitat.

Take of California tiger salamander by rural development could be reduced by requiring all development projects to avoid all suitable habitat for this species.

However, as for the California red-legged frog, this alternative approach would result in a patchwork of habitat that would not function well biologically. Therefore, this alternative conservation approach was rejected because it would result in a biologically inferior outcome. The Plan is designed to accept a limited amount of impacts to tiger salamander habitat in exchange for protection, enhancement, and restoration of higher-quality habitat outside urban areas. Most of the take will be in lower-quality habitat, although a limited amount will be in higher-quality habitat. In addition, ancillary benefits for the California tiger salamander are gained through water quality protections required by Condition 3 and stream setbacks required by Condition 11 (see Chapter 6 *Conditions on Covered Activities and Application Process*).

Another alternative that may reduce take of California tiger salamander in the study area is the prohibition of irrigated agriculture on suitable breeding or movement/upland refugia habitat. However, only agricultural activities that require a County permit are covered by this Plan. Irrigation that is part of routine and ongoing agriculture does not require a permit from the County, and therefore is not subject to the restrictions of this Plan. In addition, most agriculture in the study area occurs on the valley floor, while known occurrences of California tiger salamander are generally in the foothills outside the valley floor. In addition, a "freedom to farm" policy in the County makes regulation of agriculture difficult to implement. Therefore, this alternative was rejected.

Some of the management actions prescribed by this Plan may cause take of some individual California tiger salamanders. Specifically, increasing the connectivity between breeding sites and increasing the frequency of monitoring surveys in the study area have the potential to facilitate the spread of detrimental environmental factors (e.g., chytrid fungus, nonnative predators). It is also possible that increasing connectivity and the number of California tiger salamander populations could further facilitate hybridization between the California tiger salamander and the Texas salamander. However, the conservation strategy includes management and research actions to prevent or reduce these threats. Ultimately the benefits gained from Plan implementation are expected to strongly outweigh any potential impacts or take.

Implementation of this Plan is expected to provide a substantial net benefit to, and contribute to the recovery of, California tiger salamander in the permit area. The tiger salamander is threatened by loss of habitat and extensive fragmentation both between upland and breeding sites and among wetland/pond complexes. Up to 91 acres (9%) of modeled breeding habitat and 14,384 acres (4%) of modeled non-breeding habitat will be affected by covered activities. The Reserve System will acquire and protect an estimated 150 acres of breeding habitat and 30,000 acres of non-breeding habitat. In addition, 45 acres of breeding habitat and 11,700 acres of non-breeding habitat will be added to the Reserve System from existing open space. This will result in an increase of 91% of lands managed as species habitat in type 1 open space and a total of 27% of existing modeled habitat preserved in type 1 open space. Within the Reserve System an estimated 147 acres of perennial wetlands, seasonal wetlands, and ponds will be created or restored if all impacts under the Plan occur. Some of these creation and restoration sites may be suitable habitat for the California tiger salamander.

A network of core reserves will protect large blocks of breeding and non-breeding habitat. New linkages will be created in blocks of modeled habitat to facilitate dispersal and colonization throughout the study area and movement between breeding sites. Habitat management will improve the quality of breeding habitat (e.g., predator eradication and wetland enhancement and restoration) and upland habitat. These and additional management actions (see Chapter 5 *Conservation Strategy*) and conditions on covered activities (see Chapter 6 *Conditions on Covered Activities and Application Process*) are expected to benefit the species in the permit area to a greater degree than any considered alternatives.

11.4 Alternatives to Take of Foothill Yellow-Legged Frog

Foothill yellow-legged frogs require shallow, flowing water in small to moderate-sized streams with at least some cobble-sized substrate. This species would be affected by projects implemented in the stream channel or that result in the removal of cobblestone substrate or riparian vegetation, particularly in reaches above reservoirs. Ground-disturbing activities, such as maintenance of stream banks, levees, and channel rights-of-way (e.g., bank repair, vegetation management), could increase erosion and sediment discharge that could disrupt breeding of foothill yellow-legged frogs. Projects that place structures in the channel (e.g., culvert installation) or that require stream access may crush individuals and expose adults, metamorphs, and tadpoles. If water pulses from reservoirs are released during the foothill yellow-legged frog egg-laying period, they could dislodge egg masses, causing mortality.

One alternative to take of yellow-legged frog would be to refrain from implementing flood-control and other in-stream capital projects. However, this alternative would not provide flood protection to many neighborhoods and areas that are currently vulnerable to flooding. In addition, many of these flood-control projects are part of the SCVWD Clean, Safe Creeks and Natural Flood Protection Plan or the Coyote Watershed Stream Stewardship Plan. The former is a 15-year, countywide plan funded by a special tax that directs the SCVWD to protect public health and safety, in part through the construction of flood-control projects. The latter plan was developed by the SCVWD to address flooding and environmental issues in the Coyote watershed through an integrated approach to watershed management. The alternative of not implementing in-stream capital projects is infeasible because it would not provide needed flood protection and because it is inconsistent with the adopted and funded plans of SCVWD.

Another alternative to take of yellow-legged frog is to refrain from levee improvements within the study area. However, this would be out of compliance with levee-recertification requirements being developed by the Federal Emergency Management Agency and would affect public safety. Therefore this is not a feasible alternative.

Implementation of this Plan is expected to provide a substantial net benefit to, and contribute to the recovery of, foothill yellow-legged frog in the permit area. Up to 8.7 stream miles (<1%) of modeled primary and secondary habitat will be affected by covered activities. The Reserve System will protect an estimated 30 stream miles of modeled primary habitat and 50 miles of modeled secondary habitat. In addition, 7 stream miles of modeled primary habitat and 17 stream miles of modeled secondary habitat will be added to the Reserve System from existing open space. This will result in an 88% increase of protected modeled primary and secondary habitat in type 1 open space and protection of a total of 32% of modeled primary and secondary habitat in type 1 open space. In addition to the Plan's acquisition requirements of primary foothill yellow-legged frog habitat, the Reserve System will contain an estimated 10.4 miles of restored streams if all impacts under the Plan occur. Some of these 10.4 miles of restored streams may also be suitable for the foothill yellow-legged frog. Protection of streams with perennial flows will target reaches with high habitat value or restoration potential. Restoration and enhancement of perennial streams will ensure improvement of habitat quality and breeding success. These and additional management actions (see Chapter 5 *Conservation Strategy*) and conditions on covered activities (see Chapter 6 *Conditions on Covered Activities and Application Process*) are expected to benefit the species in the permit area to a greater degree than any considered alternatives.

11.5 Alternatives to Take of Western Pond Turtle

Western pond turtles utilize riverine habitats as well as seasonal wetlands, marshes, ponds, and upland habitat in close proximity to water. Uplands in the study area adjacent to ponds and wetlands with the appropriate soil substrate provide breeding habitat for western pond turtle, and adjacent upland habitat also accommodates year-round uses (e.g., aestivation, refugia, dispersal). In addition, this species requires basking sites in the water for year-round use.

Western pond turtle could be affected by rural development; a small portion of urban development; conversion of habitat to agriculture (e.g., vineyards); implementation of in-stream capital projects, rural water-supply capital projects and related operations and maintenance; and implementation of the conservation strategy. These projects could impact suitable breeding uplands adjacent to ponds and wetlands or suitable upland aestivation habitat. Rural development could also cause fragmentation of breeding habitat.

Take of western pond turtle by rural development could be reduced by requiring all development projects to avoid all suitable habitat for this species. However, as discussed above for the California red-legged frog, this alternative approach would result in a patchwork of habitat that would not function well biologically. Therefore, this alternative conservation approach was rejected because it would result in a biologically inferior outcome. The Plan is designed to accept a limited amount of impact to pond turtle habitat in exchange for protection, enhancement, and restoration of higher-quality habitat outside urban areas. Most of the take will be in lower-quality habitat, although a limited amount will be in higher-

quality habitat. In addition, indirect impacts to riverine habitat are avoided and minimized through water-quality protections required by Condition 3 and stream setbacks required by Condition 11 (see Chapter 6 *Conditions on Covered Activities and Application Process*).

Another alternative that may reduce take of western pond turtle in the study area is the prohibition of irrigated agriculture on suitable breeding or movement/aestivation habitat. However, only agricultural activities that require a County permit are covered by this Plan. Irrigation is part of routine and ongoing agriculture, does not require a permit from the County, and therefore is not subject to the restrictions of this Plan. In addition, most agriculture in the study area occurs on the valley floor, while known occurrences of western pond turtle are generally in the foothills outside the valley floor. Also, a "freedom to farm" policy in the County makes regulation of agriculture difficult to implement. Therefore, this alternative was rejected.

Implementation of this Plan is expected to provide a substantial net benefit to, and contribute to the recovery of, western pond turtle in the permit area. Up to 2,264 acres (3%) of modeled primary habitat and 8,811 acres (4%) of secondary habitat will be affected by covered activities. The Reserve System will acquire and protect an estimated 7,000 acres of modeled primary habitat and 20,000 acres of modeled secondary habitat. In addition, 2,800 acres of primary habitat and 9,100 acres of secondary habitat will be added to the Reserve System from existing open space. This will result in an 87% increase of lands managed as species habitat in type 1 open space and preservation of a total of 27% of existing modeled habitat in type 1 open space. Within the Reserve System, a minimum of 20 acres of ponds will be created and 1 stream mile restored, regardless of impacts. If all impacts under the Plan occur, up to 72 acres of ponds and 10.4 miles of streams will be created or restored. Some of these creation and restoration sites may be suitable habitat for the western pond turtle. A network of core reserves will protect large blocks of breeding and non-breeding habitat. New linkages will be created in blocks of modeled habitat to facilitate dispersal and colonization throughout the study area and movement between breeding sites. Habitat management will improve quality of breeding habitat (e.g., predator eradication and access control programs, woody debris and native vegetation installation) and upland habitat (e.g., grassland management). These and additional management actions (see Chapter 5 *Conservation Strategy*) and conditions on covered activities (see Chapter 6 *Conditions on Covered Activities and Application Process*) are expected to benefit the species in the permit area to a greater degree than any considered alternatives.

11.6 Alternatives to Take of Least Bell's Vireo

Least Bell's vireo is currently not known to breed in the study area, but it has been observed foraging on both Llagas and Coyote Creeks in the study area in recent years. It has also been documented successfully breeding east of the study area, in the San Joaquin River National Wildlife Refuge, for two consecutive years. It is reasonable to assume that the species breeding and foraging range

will expand northward into the study area, especially given that riparian habitat will be preserved, enhanced, and restored during the permit term. Therefore, the Plan anticipates impacts to and conservation of the species and its habitat.

Least Bell's vireos breed in the early successional riparian habitat during the spring and summer months.

Take of least Bell's vireo could result from covered activities that remove or alter early successional riparian habitat within the study area, particularly in the southern part of the study area. Impacts could also occur from any activity that diminishes dynamic riverine events (i.e., floods) that create early successional habitats, although such action may not rise to the level of take. Additional direct and indirect impacts could occur from adjacent land uses that alter associated riverine habitat or increase nearby populations of nest predators (e.g., domestic cats) or nest parasites (e.g., brown-headed cowbirds). While take of most migratory birds is prohibited under the Migratory Bird Treaty Act of 1918, take of least Bell's vireo would permitted under a Special Purpose Permit for ESA-listed species (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998: Appendix 5).

Alternative covered activities that do not include in-stream capital flood-control projects or vegetation removal for stream maintenance could reduce or eliminate impacts to least Bell's vireo. However, this alternative would put the upstream communities of Gilroy and Morgan Hill and unincorporated portions of the County at greater risk of flooding. It would also be incompatible with the Clean, Safe Creeks and Flood Protection Plan, a 15-year, countywide, special-tax-funded plan, which directs the SCVWD to protect public health and safety, in part through the construction of flood-control projects. Because the vireo requires early successional habitats, some vegetation removal is likely necessary to maintain suitable habitat. For these reasons, this alternative was rejected.

Implementation of this Plan is expected to provide a net benefit to least Bell's vireo in the permit area. Up to 115 acres (4%) of modeled primary habitat will be affected by covered activities. The Reserve System will acquire and protect a minimum of 460 acres of modeled primary habitat. In addition, 2 acres of modeled primary habitat will be added to the Reserve System from existing open space. All species habitat will be enhanced. This will result in a 865% increase of preserved modeled habitat as type 1 open space and a total of 20% of modeled habitat preserved as type 1 open space. In addition to the Plan's acquisition requirements of least Bell's vireo primary habitat, the Reserve System will include a minimum of 50 acres of restored riparian forest and scrub, regardless of impacts. If all impacts under the Plan occur, up to 353 acres of riparian forest and scrub and Central California alluvial sycamore woodland will be restored, some of which may be primary habitat for the least Bell's vireo. New reserves will increase habitat connectivity by targeting areas along rivers. Habitat management will ensure improvement of habitat quality and favor increased reproductive success through riparian woodland and forest enhancement and restoration. The Plan also requires 1:1 restoration for any loss of riparian forest and scrub communities (including *willow riparian forest and scrub* and *mixed riparian forest and woodland*, see **Table 5-12** and text in Chapter 5 *Conservation*

Strategy) These and additional management actions (see Chapter 5 *Conservation Strategy*) and conditions on covered activities (see Chapter 6 *Conditions on Covered Activities and Application Process*) are expected to benefit the species in the permit area to a greater degree than any considered alternatives.

11.7 Alternatives to Take of Western Burrowing Owl

Western burrowing owl habitat includes annual grassland, serpentine bunchgrass grassland, valley oak woodland, agricultural, barren land cover types with flat (0–5%) or moderate (5–25%) slopes, and ruderal habitats on the valley floor. Only a few of these sites, primarily in San José, are occupied by breeding owls on a consistent basis, but there is the potential for these small pockets of habitat to support breeding pairs. Specific sites that support the owl are targeted for nearby land acquisition to protect this species and provide additional habitat for fledging young birds. Western burrowing owls use the ground squirrel burrows for shelter and breeding. Primary threats to this species by covered activities include development of their habitat in suburban and rural areas and ground squirrel control along levees and dams and in rural areas. While take of most migratory birds is prohibited under the Migratory Bird Treaty Act of 1918, take of western borrowing owl would be permitted under a Special Purpose Permit in the event that this species was federally listed (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998: Appendix 5).

An alternative to covered activities that eliminate or greatly reduce suburban or rural development could reduce take of the western burrowing owls and their habitat. However, based on general conservation biology principles development within already developed areas is preferable in order to reduce impacts to other covered species. Areas that are near known owl populations are targeted for protection and/or management within the Reserve System (see Section 5.4.6 *Western Burrowing Owl*). Therefore, an alternative to eliminate development in burrowing owl habitat was rejected.

An alternative to rodent control on levees was also considered. However, ground squirrel burrows can destabilize levees and dams, and eliminating ground squirrel control measures would not be consistent with the SCVWD Dam Maintenance Program or SCVWD stream maintenance needs. Therefore, this alternative was rejected.

Implementation of this Plan is expected to provide a substantial net benefit to, and contribute to the recovery of, western burrowing owl in the permit area. Up to 10,443 acres (8%) of modeled overwintering habitat will be affected by covered activities. The Reserve System will acquire and protect an estimated 17,000 acres of modeled species overwintering habitat and acquire or manage 5,300 acres of western burrowing owl nesting habitat (occupied and potential). Of the 5,300 acres, a minimum of 600 acres of occupied nesting habitat must be protected in fee title or conservation easement. For the remaining 4,700 acres, land acquisition (fee title or easement) or management agreements may be used,

with land acquisition prioritized over management agreements. In addition, 4,310 acres of modeled overwintering habitat will be added to the Reserve System from existing open space. The geographic breakdown of these newly managed areas for burrowing owls would include the following minimum acreages: 3,700 acres in the North San José/Baylands region, 800 acres in the Gilroy region, 530 acres in the Morgan Hill region, and 270 acres in the South San José region as shown in **Figure 5-10**. The conservation strategy will ensure management of both breeding and overwintering habitat. These and additional management actions (see Chapter 5 *Conservation Strategy*) and conditions on covered activities (see Chapter 6 *Conditions on Covered Activities and Application Process*) are expected to benefit the species in the permit area to a greater degree than any considered alternatives.

11.8 Alternatives to Take of Tricolored Blackbird

Tricolored blackbirds breed colonially in freshwater marshes and other wetland habitats with reeds, cattails, or other emergent or non-emergent wetland vegetation (such as blackberry). This species also requires foraging habitat that includes agricultural fields, wetlands, marshes, annual grassland, and riparian scrub. Potential tricolored blackbird breeding sites will be directly affected by any covered activities that result in the removal or permanent alteration of wetland or marsh habitat and/or adjacent foraging habitat. Conversion of lands from native or agricultural land cover to rural, suburban or urban use could result in the degradation of foraging habitat for this species. While take of most migratory birds is prohibited under the Migratory Bird Treaty Act of 1918, take of tricolored blackbird would be permitted under a Special Purpose Permit in the event that this species was federally listed (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998: Appendix 5).

An alternative that prohibits development in or closely adjacent to marshes, wetlands and wetland vegetation would reduce take of tricolored blackbird habitat. Currently, the Plan includes extensive avoidance and minimization measures for these habitats (see Conditions 11 and 12 in, Chapter 6 *Conditions on Covered Activities and Application Process*) as well as specific conditions to survey for and avoid tricolored blackbird populations and individuals (see Condition 17 in Chapter 6 *Conditions on Covered Activities and Application Process*). The Plan also includes required conservation measures for habitat creation and preservation to ensure at least 2 acres of freshwater wetlands are preserved and one acre restored for each acre of freshwater wetlands lost to covered activities. Similarly, impacts to streams require 3:1 preservation and 1:1 restoration.

Alternative covered activities that do not include in-stream capital flood-control projects or vegetation removal for stream maintenance could reduce or eliminate impacts to tricolored blackbird. However, this alternative could put the upstream areas at greater risk of flooding and it would also be incompatible with the Clean, Safe Creeks and Flood Protection Plan of SCVWD. Therefore, this alternative was rejected.

Alternatives that entirely eliminate conversion of native or agricultural land to rural, suburban or urban use could prevent some take of tricolored blackbird foraging habitat, however this option is incompatible with the County General Plan and the General Plan of the cities of Gilroy and Morgan Hill (there will be little agricultural conversion in San José) and was therefore rejected. Further, surveys during the design phase of a project will require avoidance and minimization of impacts to tricolored blackbird (see Condition 17 in Chapter 6 *Conditions on Covered Activities and Application Process*).

Implementation of this Plan is expected to provide a substantial net benefit to, and contribute to the recovery of, tricolored blackbird in the permit area. Up to 11,454 acres (8%) of modeled habitat will be affected by covered activities. The Reserve System will acquire and protect an estimated 19,000 acres of modeled species habitat. In addition, 3,840 acres of modeled species habitat will be added to the Reserve System from existing open space. All species habitat within the Reserve System will be enhanced. This will result in a 207% increase of lands managed as species habitat and the protection of a total of 24% of existing modeled habitat as type 1 open space. Within the Reserve System, a minimum of 40 acres of ponds and perennial wetlands will be created or restored, regardless of impacts. If all impacts under the Plan occur, up to 117 acres of ponds and perennial wetlands will be created or restored. Some of these creation and restoration sites may be suitable habitat for the Tricolored blackbird. New reserves will ensure protection of at least four currently occupied or historic breeding sites and nearby foraging habitat. These and additional management actions (see Chapter 5 *Conservation Strategy*) and conditions on covered activities (see Chapter 6 *Conditions on Covered Activities and Application Process*) are expected to benefit the species in the permit area to a greater degree than any considered alternatives.

11.9 Alternatives to Take of San Joaquin Kit Fox

The primary impact to San Joaquin kit fox from covered activities is additional habitat fragmentation and associated reduction of adequate corridors in the southern portion of the study area near the Pajaro River and Pacheco Creek. The primary mechanism of this impact is human population growth in Gilroy and increased urbanization in southeastern Gilroy and limited rural development along the SR 152 corridor east of Gilroy (within unincorporated Santa Clara County). San Joaquin kit fox may move through the southeastern portion of the study area from San Benito County to adjacent Merced and Stanislaus Counties. This loss of habitat or movement corridors could result in harm to San Joaquin kit fox and hence constitute take. Another potential cause of take is construction of rural roads or increases in rural vehicle traffic along SR 152 that could result in mortality.

One alternative to take is the prohibition of rural development along the SR 152 corridor east of Gilroy. However, this is inconsistent with the County General Plan. Rural development along SR 152 east of Gilroy is expected to occur at very low densities and is not expected to increase substantially during the permit

term due to its distance from public services, large parcel sizes, and strong local tradition of agriculture in the Pacheco Creek valley and ranching in the adjacent hills. As such, threats to kit fox in this area from rural development are relatively low. Because habitat in the study area is not known to be occupied by kit fox, it is legally and practicably infeasible to preclude growth in all areas of unoccupied but suitable habitat for the species, so this alternative was rejected.

An alternative that limits traffic on rural roads within suitable secondary habitat (movement corridors) for San Joaquin kit fox may reduce the incidence of mortality on roads and therefore reduce take in the study area. This alternative was deemed infeasible and rejected because limiting traffic on rural roads is not under the control of the Permittees or the Plan. Furthermore, SR 152 is the only route that crosses from south Santa Clara County to the San Joaquin Valley. Directing traffic to other routes would be infeasible and would divert heavy traffic to other routes, some of which already receive heavy use. This alternative could have severe impacts on traffic elsewhere in the region and could negate the benefits provided to San Joaquin kit fox in the south part of the study area by increasing vehicle mortality of kit foxes elsewhere in its range. It could also increase impacts to Bay checkerspot butterfly by increasing vehicular emissions in the study area from slower traffic. Because San Joaquin kit fox have not been sited in the study area in recent years, take from vehicular collision is highly unlikely at this time. As described in Chapter 5, there are several wide undercrossings available to kit fox and other species under SR 152 that would already limit the risk of vehicle collisions.

Implementation of this Plan is expected to provide a net benefit to San Joaquin kit fox in the permit area. The study area is outside the core range of the kit fox but is important as a movement route, although that may change with the habitat acquisition and management proposed by the conservation strategy. As such, the corridor study proposed by the Plan as well as actions that enhance key corridor routes are likely to benefit the species.

Up to 278 acres (<1%) of modeled habitat will be affected by covered activities. The Reserve System will acquire and protect an estimated 4,100 acres of modeled secondary habitat. Within the Reserve System all habitat will be enhanced. This will result in an increase of 81% of protected modeled habitat in type 1 open space and a total of 22% of modeled habitat protected in type 1 open space. A network of core reserves and movement routes will protect a critical linkage for San Joaquin kit fox through the study area to adjacent populations in Alameda and Contra Costa Counties. Grassland and oak woodlands will be managed to support a sustainable prey population. Barriers to passage will be removed and structural improvements to facilitate movement will be implemented to improve species passage across SR 152. A public-awareness campaign will encourage species-compatible land uses outside the Reserve System. These and additional management actions (see Chapter 5 *Conservation Strategy*) and conditions on covered activities (see Chapter 6 *Conditions on Covered Activities and Application Process*) are expected to benefit the species in the permit area to a greater degree than any considered alternatives.

Chapter 12
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Chapter 13
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13.2 Chapter 2

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13.3 Chapter 3

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13.6 Chapter 6

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