Final

Santa Clara Valley Habitat Plan

Santa Clara County, California

Volume 1 of 4:
Executive Summary
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County of Santa Clara
City of San José
City of Morgan Hill
City of Gilroy
Santa Clara Valley Water District
Santa Clara Valley Transportation Authority

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Executive Summary

Overview

The Santa Clara Valley Habitat Plan (Plan) provides a framework for promoting the protection and recovery of natural resources, including endangered species, while streamlining the permitting process for planned development, infrastructure, and maintenance activities. The Plan will allow the County of Santa Clara (County), the Santa Clara Valley Water District (SCVWD), the Santa Clara Valley Transportation Authority (VTA) and the cities of Gilroy, Morgan Hill, and San José (collectively, the Local Partners or Permittees) to receive endangered-species permits for activities and projects they conduct and those under their jurisdiction. The Santa Clara Valley Open Space Authority (Open Space Authority) has also contributed to Plan preparation. The Plan will protect, enhance, and restore natural resources in specific areas of Santa Clara County and contribute to the recovery of endangered species. Rather than separately permitting and mitigating individual projects, the Plan evaluates natural-resource impacts and mitigation requirements comprehensively in a way that is more efficient and effective for at-risk species and their essential habitats.

This Plan was developed in association with the U.S. Fish and Wildlife Service (USFWS), and the California Department of Fish and Game (CDFG), and in consultation with stakeholder groups and the general public. The Permittees are asking the USFWS to issue them a 50-year permit that authorizes incidental take[1] of listed species under the federal Endangered Species Act (ESA). The Permittees are also asking CDFG to issue to them a 50-year permit that authorizes take[2] of all covered species under the Natural Community Conservation Planning Act (NCCP Act). This approach will allow the Permittees to streamline future mitigation requirements into one comprehensive program. In addition to obtaining take authorization for each participating agency's respective activities, the cities and County will be able to extend take authorization to project applicants under their jurisdiction.

USFWS and CDFG (collectively the Wildlife Agencies) will also provide assurances to the Permittees that no further commitments of funds, land, or water

[1] *Take*, as defined by the Endangered Species Act, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." *Harm* is defined as "any act that kills or injures the species, including significant habitat modification."
[2] *Take* is defined under the California Fish and Game Code as any action or attempt to "hunt, pursue, catch, capture, or kill."

will be required to address impacts on covered species beyond that described in the Plan to address changed circumstances.

In addition to strengthening local control over land use and species protection, the Plan will provide a more efficient process for protecting natural resources by creating new habitat reserves that will be larger in scale, more ecologically valuable, and easier to manage than the individual mitigation sites created under the current approach.

Geographic Scope

The study area (519,506 acres) is located in Santa Clara County in the central California Coast Range. The primary valley in the study area is the Santa Clara Valley, which stretches from San Francisco Bay to San Benito County. The Santa Clara Valley is bounded on the east by the Diablo Range, on the west by the Santa Cruz Mountains, and on the north by the San Francisco Bay shoreline. The study area was defined as the area in which covered activities will occur, impacts will be evaluated, and the majority of Plan conservation activities will be implemented. Some conservation actions for western burrowing owl will occur in the northern portion of the County in an area referred to as the expanded study area for burrowing owl conservation. The boundary of the study area was based on political, ecological, and hydrologic factors. The study area excludes tidally influenced portions of the Baylands. See **Figures 1-1 and 1-2** for maps of the study area, which covers 62% of the county.

The Santa Clara Valley is generally split into two geographic regions, the North Valley and the South Valley. The North Valley is extensively urbanized and is home to almost all of the County's residents. Thirteen of the County's fifteen cities are located in the North Valley, while the remaining two cities, Gilroy and Morgan Hill, are located in the South Valley. The South Valley remains predominantly rural, with the exception of Gilroy, Morgan Hill, small unincorporated community of San Martin, and scattered residential areas generally having parcels of five acres or less. Low-density residential developments are also scattered along the Valley floor and foothill areas. Almost the entire city of San José lies within the study area.

Permit Term

The permit term is the time period in which all covered activities can receive take authorization under the Plan, consistent with the requirements of the Plan. The permit term is also the time in which all conservation actions must be successfully completed to offset the impacts of the covered activities. The Permittees will request permits from CDFG and USFWS. Each permit will be issued to all Permittees collectively. These permits will be tied to this Plan and to the Implementing Agreement. The Local Partners are seeking permits from the Wildlife Agencies with terms of 50 years. The permit term of 50 years was selected because it allows for the full and successful implementation of the covered activities, the conservation strategy, the monitoring and adaptive management program, and the funding strategy.

Covered Activities

A primary goal of this Plan is to obtain authorization for incidental take of covered species under the ESA and the NCCP Act for specific activities, called covered activities, which will occur in accordance with approved land-use and capital-improvement plans. Covered activities in the Plan fall into seven general categories.

- Urban development.
- In-stream capital projects.
- In-stream operations and maintenance.
- Rural capital projects
- Rural operations and maintenance
- Rural development
- Conservation strategy implementation (i.e., activities within the lands managed, enhanced, restored, and monitored to conserve the natural resources targeted by this Plan).

Covered Species

This Plan provides take authorization for 18 listed and non-listed species (i.e., covered species) (**Table ES-1**). The 18 covered species were identified from a larger pool of 148 species in the region that are listed or that could become listed during the permit term. Species were selected for coverage based on their potential to be affected by covered activities, their occurrence in the study area, the adequacy of data for the species, and the species' current or foreseeable listing status. The Plan includes conservation measures to protect all 18 species selected for coverage under the Plan, whether or not they are currently listed. Accordingly, should any non-listed, covered species become listed during the permit term, additional conservation measures will not be required.

Table ES-1. Covered Species

Invertebrates	Plants
Bay checkerspot butterfly	Tiburon Indian paintbrush
Amphibians and Reptiles	Coyote ceanothus
California tiger salamander	Mount Hamilton thistle
California red-legged frog	Santa Clara Valley dudleya
Foothill yellow-legged frog	Fragrant fritillary
Western pond turtle	Loma Prieta hoita
Birds	Smooth lessingia
Western burrowing owl	Metcalf Canyon jewelflower
Least Bell's vireo	Most beautiful jewelflower
Tricolored blackbird	
Mammals	
San Joaquin kit fox	

Conservation Strategy

The conservation strategy was designed to mitigate impacts on covered species and to contribute to the recovery of these species in the study area. The conservation strategy provides for the protection and enhancement of natural resources at multiple scales including landscape, natural-community, and species-specific levels.

The conservation strategy is based on a set of biological goals and objectives developed specifically for the Plan. Conservation actions were then identified to achieve these goals and objectives. The conservation strategy consists of the following major components:

- the acquisition of land and the creation of a Reserve System, including regional connections between protected areas;
- the long-term management, enhancement, and in some cases restoration of natural communities within the Reserve System;
- the development of a comprehensive aquatic conservation strategy to address the needs of covered amphibians and aquatic reptiles;
- the implementation of a comprehensive, long-term, adaptive management and monitoring program; and
- the implementation of avoidance and minimization measures on covered activities (called conditions on covered activities).

The general level of conservation effort for each covered species and natural community was determined by four broad criteria, namely:

- amount of impact from covered activities;

- proportion of the species' range or uniqueness of natural community in study area;
- rarity in study area; and
- stressors and threats in study area.

The benefits of the conservation strategy for each of the covered species are summarized in **Table ES-2**.

Reserve System

The heart of the conservation strategy is the creation of a Reserve System that will protect an estimated 46,920 acres for the benefit of covered species, natural communities, biological diversity, and ecosystem function. Land acquisition and protection will create a network of reserves that accomplishes the following:

- Acquires and permanently protects a minimum of 33,205 acres and an estimated 33,629 acres of land for the benefit of covered species, natural communities, biological diversity, and ecosystem function.
- Permanently protects up to 13,291 acres of existing open space areas and enhances the long-term management and monitoring on those lands within the Reserve System. Therefore, the total size of the Reserve System will be an estimated 46,496 acres to 46,920 acres.
- Protects 100 miles of streams.
- Provides management and monitoring of habitats on protected lands to enhance populations of covered species and maintain ecosystem processes.
- Preserves major local and regional connections between key habitat areas and between existing protected areas.

The Plan describes a detailed but flexible process to assemble the Reserve System using acquisition of fee title or conservation easements from willing sellers and partnerships with other conservation organizations already active in the region. Reserve assembly will be required to stay ahead of the impacts of covered activities. All land acquisition will be completed by Year 45 of the permit term.

Habitat Enhancement and Restoration

All terrestrial and aquatic land cover types in the Reserve System, including streams, will be enhanced to benefit covered and other native species. Wetland and aquatic land cover types will be restored, which involves the recovery of a natural community that has been ecologically degraded. Restoration actions will promote ecosystem recovery by enhancing functional processes, species composition, and community structure. To contribute to species recovery, a minimum of 90 acres of riparian woodland and scrub, wetlands, and ponds will be restored and a minimum of 1.0 mile of stream will be restored regardless of the level of impacts. The remaining restoration will occur according to ratios of 1:1 or 2:1. If all predicted impacts occur, the Plan will restore up to 500 acres of riparian woodland and scrub, wetlands, and ponds, and up to 10.4 miles of streams to offset losses of these land cover types and to contribute to species recovery. Construction of all habitat-restoration or creation projects will be completed by Year 40 of the permit term.

Adaptive Management and Monitoring

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. Monitoring the outcomes of management is the foundation of an adaptive approach. The Plan contains detailed guidelines and recommendations for monitoring landscapes as well as the management, enhancement, or restoration of the following land cover types:

- Grassland, including serpentine grassland,
- Chaparral and northern coastal scrub,
- Oak and conifer woodland,
- Riverine and riparian forest, and
- Wetlands and ponds.

The Plan also contains guidelines for the monitoring and adaptive management of each covered species. The program will incorporate important principles of “learning by doing” into the operation of the Reserve System.

Conditions on Covered Activities

A primary component of regional species protection is the development of comprehensive avoidance and minimization measures to help ensure that impacts from covered activities are reduced. As such, the Plan has developed broad principles for regional avoidance and minimization as well as specific conditions on covered activities. All Permitees and private applicants under the jurisdiction of Gilroy, Morgan Hill, San José, and the County will be required to adhere to these measures in order to receive take authorization. All parties covered by the Plan will submit an application package to receive or document take authorization.

As a regional conservation plan, one of the greatest benefits of the Plan is that mitigation for individual projects can be implemented systematically on a landscape scale. Regional avoidance and minimization concentrates protection in areas where it has the greatest value. By protecting high-quality areas and restricting covered activities in these areas, regional avoidance and minimization goals are supported. Conditions on covered activities are included that

- minimize impacts on sensitive natural communities and covered species,

- minimize impacts on select ground-dwelling wildlife species during project construction,
- ensure compliance with related state and federal wildlife laws,
- establish a comprehensive stream- and riparian-setback requirement, and
- protect water quality in wetlands and streams.

Implementation

A new organization will be created to oversee assembly and operation of the Reserve System, oversee implementation of other conservation actions, develop and oversee the management and monitoring program, and ensure compliance with all terms of the Plan, permits, and Implementing Agreement. This *Implementing Entity* will be run by a Governing Board and Implementation Board that will consist of designated officials from each of the Permittees. The Implementing Entity will be advised by representatives of USFWS and CDFG, local land-management agencies, a technical advisory committee, a pool of science advisors, and a public advisory committee. It is anticipated that the Implementing Entity will partner with existing agencies and organizations to conduct a significant portion of its responsibilities.

The Plan also includes a detailed process for land acquisition from willing sellers and allowances for landowners to provide land in lieu of fees under certain circumstances.

Cost and Funding

The cost of implementing the HCP/NCCP during the 50-year permit term is estimated at an average of approximately $11 million annually. This includes the cost of land acquisition, Plan administration, habitat management, habitat restoration, biological monitoring, remedial measures, and a contingency. Plan costs were estimated from a detailed model of all expected cost components based on actual costs of tasks.

In addition, the Plan will create an endowment during the permit term to fund all needed implementation after the permit term. An endowment of $90 million in current dollars is needed to generate average annual real returns of $3.5 million to fund post-permit term management and monitoring of the Reserve System.

Plan funding will come from a number of different sources, including fees on private development and public infrastructure, conservation actions by local and state agencies, and state and federal funding. In general, 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). Additional information on funding sources is provided below:

- **Development Fees (Private).** This source includes developer mitigation fees or developer land dedications in lieu of fees.
- **Development Fees (Public Infrastructure).** This source includes fees paid by public infrastructure projects and operations that are covered by this Plan such as roads, flood-control and water-supply facilities, and other public projects.
- **Local Funding.** Non-fee local funding will take many forms, including continued and new investments in conservation actions and land acquisition by organizations such as the Santa Clara County Parks and Recreation Department (County Parks), local land management agencies, local land trusts, and local foundations.
- **State and Federal Funding.** This source includes federal and state grant programs that may fund land acquisition, habitat restoration, and other conservation actions. 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.

A summary of the Plan costs and funding strategy is presented in **Table ES-3**.

The 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 Plan, public and private entities whose activities would affect listed 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 listed species. Project proponents may also have to implement mitigation required by local jurisdictions based on an environmental analysis conducted for CEQA compliance. To comply with the NCCP Act, 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.

Table ES-3. Habitat Plan Cost and Funding Overview

Type	Amount (rounded to nearest $10,000)
Estimated Costs Over Permit Term	
Land Acquisition	$278,940,000
Reserve Management and Maintenance	$95,360,000
Monitoring, Research, and Scientific Review	$30,230,000
Western Burrowing Owl Conservation Strategy	$8,570,000
Habitat Restoration/Creation	$92,630,000
Program Administration	$45,890,000
Contingency Fund	$12,420,000
Plan Preparation Costs	$3,010,000
Endowment Balance at End of Permit Term	$90,140,000
Total Estimated Costs	***$657,190,000***
Projected Funding[1]	
Fee Funding	
Land Cover and Nitrogen Deposition Fees	$175,460,000
Serpentine Fee	$29,270,000
Wetland Fee	$77,600,000
Burrowing Owl Fee	$8,830,000
Temporary Impact Fees	$16,010,000
Endowment Fee Component	$36,500,000
Plan Preparation Fee Component	$3,010,000
Participating Special Entity Fees	$17,000,000
Total projected fee funding	$363,680,000
Non-Fee Funding	
Land acquisition by County Parks	$45,980,000
Land acquisition by other local land agencies, non-profits, foundations	$77,270,000
Interest Income on Permit Period Funding	$2,180,000
Endowment Investment Income	$53,640,000
New Wildlife Agency funds (ESA Section 6, park bonds, etc.)	$115,000,000
Total Non-Fee Funding	$294,070,000
Total Projected Funding	***$657,750,000***

Table ES-2. Summary Evaluation of Species Proposed for Coverage by the Santa Clara Valley Habitat Plan

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
Bay checkerspot butterfly (*Euphydryas editha bayensis*)/(T/–)			
Status in Range: Most historic populations occurring in the southern and eastern portions of the greater San Francisco Bay Area in serpentine grassland habitat have been extirpated, with the exception of south-central Santa Clara County (multiple locations) and one reintroduction site in San Mateo County. The reintroduction had very limited success, one adult was observed in 2008, the year following the reintroduction. Species is reported to be declining within its highly restricted range.	**Land Acquisition:** 3,800 acres modeled habitat acquired for Reserve System. 754 acres modeled habitat added to Reserve System from existing open space. Successful implementation of the Habitat Plan will result in the acquisition, protection, and management of a portion of most Bay checkerspot critical habitat units, all four of the core habitat areas as identified in Figure 5-A of the 1998 Serpentine Recovery Plan (Kirby, Metcalf, San Felipe, and Silver Creek Hills) to ensure occupancy of each of the four core habitat units, and at least three of the six (50%) satellite habitat units identified in the 1998 Serpentine Recovery Plan (W. Hills of Santa Clara Valley, Tulare Hill, Santa Teresa Hills, Calero, Communication Hill, or North of Llagas Avenue) by Year 45. Protection of sites will be prioritized according to threat, patch size, current occupancy, and prevalence of cool microsites.	**Permanent:** 300 acres of modeled primary habitat (3%), which includes a maximum of 300 acres of critical habitat.	Conduct annual surveys of post-diapause larvae in occupied habitat and of host plants and adult butterflies in suitable, unoccupied habitat. Evaluate species response to grassland management. Evaluate translocation efforts determine success of new population establishment.
Status in Permit Area: 8,621 acres of modeled habitat. 1,336 acres of modeled habitat currently protected in Type 1 open space. Species is abundant in multiple populations along the eastern foothills, from Silver Creek Hills down Coyote Ridge to Pigeon Point. Several populations regularly comprise more than 250,000 adult butterflies. South of Pigeon Point, species is present in small patches of grassland west of Coyote Reservoir. On west side of permit area, species is variably present in serpentine grasslands adjacent to Hale Avenue, adjacent to Kalana Avenue, in southern portions of the Santa Teresa Hills, in hills near Calero Reservoir, and on Tulare Hill. Species is reported to be declining in the permit area.	**Enhancement, Restoration, and Creation:** All acquired/added habitat enhanced to ensure occupancy of at least three of the six (50%) satellite habitat units identified in the 1998 Serpentine Recovery Plan (W. Hills of Santa Clara Valley, Tulare Hill, Santa Teresa Hills, Calero, Communication Hill , or North of Llagas Avenue). Conservation strategy specifies appropriate grazing regimes, prescribed burns, seeding with native forbs and grasses, and other appropriate vegetative management techniques to increase diversity of native plants on acquired species habitat. Translocation of species from core populations to unoccupied suitable habitat may be conducted in close coordination with the Wildlife Agencies.	**Temporary:** 54 acres of modeled primary habitat (<1%), which includes a maximum of 49 acres of critical habitat.	
Conditions on Covered Activities: Development guidelines will ensure that impacts on this species from covered activities are minimized (Condition 13). This includes design measures to limit project footprint, buffer establishment, and landscaping restrictions. Surveys will be conducted to evaluate habitat quality and allow for development to occur as far as possible from high-quality habitat.			
Net effects: Up to 354 acres (4%) of modeled primary habitat, including 349 acres of critical habitat, will be affected by covered activities. The Reserve System will protect a minimum of 4,554 acres of modeled primary habitat as Type 1 open space all of which will be enhanced. This will result in a 341% increase of lands managed as primary habitat and a total of 68% of existing modeled habitat protected as Type 1 open space. Extensive land acquisition will protect all four of the core habitat areas as defined in the recovery plan for the species namely, Kirby, Metcalf, San Felipe, and Silver Creek Hills and secondary sites deemed essential for species recovery. Most critical habitat units will be partially protected with the successful implementation of the Habitat Plan (including lands currently protected as Type 1 open space). New reserves will ensure protection of the ranges of slopes, aspects, and microhabitats important to the species (LAND-G3, L5) and management of habitat to enhance populations of larval host plants and adult nectar sources to allow for natural migration across reserves (GRASS-1–4, LM-11). Targeted studies will allow for population translocation to unoccupied suitable habitat (GRASS-7) with close coordination with the Wildlife Agencies. Development guidelines will ensure that indirect impacts on this species from covered activities that occur outside the Reserve System are minimized. This includes limiting impacts to 3%, 11%, or 13% in any one core area (Condition 13). The Plan will contribute substantially to the recovery of the species in the permit area and, consequently, throughout its range through habitat acquisition, habitat enhancement, and avoidance or minimization of direct impacts on the species.			

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
California tiger salamander (*Ambystoma californiense*)/(T/T)			
Status in Range: Endemic to grasslands of California, species is distributed in six populations: (1) Santa Rosa, Sonoma County; (2) Bay Area (central and southern Alameda, Santa Clara, western Stanislaus, western Merced, and San Benito Counties); (3) Central Valley (Yolo, Sacramento, Solano, eastern Contra Costa, northeast Alameda, San Joaquin, Stanislaus, Merced, and northwestern Madera Counties); (4) southern San Joaquin Valley (portions of Madera, central Fresno, and northern Tulare and Kings Counties), (5) Central Coast Range (southern Santa Cruz, Monterey, northern San Luis Obispo, and portions of western San Benito, Fresno, and Kern Counties); and (6) Santa Barbara County. Most populations occur at elevations of 200–1,500 feet, having been extirpated at lower elevations due to presence nonnative species in breeding ponds; however, extirpation has occurred across species range due to habitat loss. Species is reported to be declining throughout its limited California range.	**Land Acquisition:** 30,150 acres modeled habitat acquired for Reserve System. 11,745 acres modeled habitat added to Reserve System from existing open space. Included in the acreages above are 50 to 104 acres of ponds and 15 to 80 acres of wetlands. Reserve System species occupancy requirements include 25% of ponds/wetlands by Year 30 and 30% by Year 45. Extensive land acquisition will occur in 7 critical habitat units. Target areas include areas adjacent to existing open space (Joseph D. Grant County Park, Palassou Ridge Open Space Preserve, and Henry W. Coe State Park), and isolated areas (east of Uvas Reservoir) with known species occurrences. To ensure habitat connectivity, upland habitat between ponds/wetlands will be targeted between known occurrences in Santa Cruz foothills and Diablo Range, including areas near Santa Teresa Hills and Tulare Hill, and along Pajaro River south of Gilroy.	**Permanent:** 77 acres of modeled breeding habitat (7%). 12,855 acres of modeled non-breeding habitat (4%). 12,932 acres total, (4%), including up to 264 acres of critical habitat.	Conduct annual surveys of occupied and potential breeding and upland habitat. Evaluate species response to habitat enhancement, restoration, or creation. Determine species response to predator control programs. Determine effects of and response to additional threats, such as diseases and hybridization.
Status in Permit Area: 324,748 acres of modeled habitat (breeding and non-breeding). 45,767 acres of modeled habitat currently protected in Type 1 open space (breeding and non-breeding). Approximately 100 occurrence records (1990–2005) scattered throughout the permit area and on both sides of the Santa Clara valley, with large clusters of occurrences in Joseph D. Grant County Park. Eight historical breeding areas along the valley floor and along the US 101 corridor have been extirpated due to habitat conversion to development. Status of species in permit area is unknown.	**Enhancement, Restoration, and Creation:** 50 to 104 acres of ponds and 15 to 80 acres of wetlands enhanced. 20 to 72 acres of ponds created/ 20 to 75 acres of wetlands restored. Conservation Strategy specifies targeting sites to reduce habitat fragmentation and promote genetic exchange within the population. This includes sites within dispersal distance of known breeding sites to contribute to species recovery, as well as replacement of sites lost to covered activities. Site characteristics include hydrologic, geomorphic, and soil conditions to ensure successful restoration/creation. All acquired/added habitat will be enhanced to ensure occupancy of 30% of ponds and wetlands in each of the federal Recovery Units 4 and 6 in the Reserve System.	**Temporary:** 14 acres of modeled breeding habitat (1%). 1,529 acres of modeled non-breeding habitat (<1%). 1,543 acres total (<1%), including up to 119 acres of critical habitat.	
Conditions on Covered Activities: Development guidelines for wetlands and ponds (breeding habitat) and valley oak and blue oak woodlands (upland habitat) will minimize effects of covered activities (Conditions 12, 14). Stream and Riparian Setbacks, may also have ancillary benefits to this species. Although the streams themselves do not provide habitat, aquatic breeding sites and dispersal corridors may be located within the riparian areas protected by the setbacks (Condition 11). Project planning guidelines include maintenance of landscape connectivity, maintenance of site hydrology to the extent possible, and establishment of buffer/setback requirements. Construction guidelines include buffer zone establishment and fencing; staking of wetlands/ponds during construction; staff training by professional biologist; erosion control measures; and restrictions on seasonality of activities, vegetative management, use of heavy machinery, access points, and ground disturbance (Conditions 12, 14). Recreational use guidelines include leash law restrictions and public access limitations within reserve recreational use areas to prevent potential species impacts from domestic dogs (Condition 9).			
Net effects: Up to 91 acres (9%) of modeled breeding habitat and 14,384 acres (4%) of modeled non-breeding habitat, including 383 acres of critical habitat, will be affected by covered activities. The Reserve System will protect and enhance a minimum of 195 acres of modeled breeding habitat and 41,700 acres of non-breeding habitat as Type 1 open space. This will result in an increase of 92% of lands managed as species habitat and a total of 27% of modeled habitat protected as Type 1 open space. A minimum of 105 and up to 331 acres of aquatic habitat will be created/restored/enhanced in the Reserve System. Some of these sites will be suitable species habitat. A network of core reserves will protect large blocks of breeding/non-breeding habitat. New linkages will be created in blocks of modeled habitat to facilitate dispersal and colonization throughout the permit area and movement between breeding sites (LAND-G2, OC1–5, WP4–7). 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) (POND-1–4, 9–11, 13; GRASS-1, 2; LM-11–14; STUDIES-7, 8). Development guidelines will ensure that impacts on this species from covered activities outside the Reserve System are minimized (Conditions 9, 12, 14). The Plan is likely to benefit the species in the permit area through habitat acquisition, habitat enhancement/restoration, and avoidance and minimization of direct impacts on the species.			

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
California red-legged frog (*Rana aurora draytonii*)/(T/CSC)			
Status in Range: Although the historical distribution extended south along the coast from Pt. Reyes National Seashore in Marin County and inland from Redding in Shasta County to northwestern Baja California, current distribution is limited to isolated patches in the Sierra Nevada, Northern Coast Ranges, and Santa Monica Mountains. Taxon remains common in the San Francisco Bay area and along the central coast. In southern California, taxon is believed extirpated from Santa Rosa Ecological Reserve but persists in the Santa Monica Mountains and in San Fransquito Canyon in Newhall. Species is reported to be declining at a global scale, as well as in California.	**Land Acquisition:** 31,300 acres modeled habitat acquired for Reserve System. 11,930 acres modeled habitat added to Reserve System from existing open space. Included in the acreages above are 15 to 80 acres of wetlands, 50 to 104 acres of ponds, and 100 miles of streams. 35% of ponds/wetlands in each of the federal Recovery Units 4 and 6 in the Reserve System will be occupied by species by Year 30 and with 40% by Year 45. Target areas include the East San Francisco Bay Recovery Unit, Critical Habitat Unit STC-1A, and areas adjacent to existing open space with known species occurrences, such as Joseph D. Grant County Park, Palassou Ridge Open Space Preserve, and Henry W. Coe State Park.	**Permanent:** 299 acres of modeled primary habitat (3%). 12,937 acres of modeled secondary habitat (4%). 13,236 acres total (4%), including 1,023 acres of critical habitat.	Conduct preacquisition baseline surveys to document species occupancy, potential occupied breeding habitat, quality of upland habitat around occupied or potential breeding habitat, presence of predators, and presence of other threats that may affect reproductive success. Determine presence/absence of potential breeding adults through nighttime breeding season surveys. Conduct daytime surveys to determine local species population. Determine species response in occupied habitat to enhancement and restoration techniques. Evaluate quality and quantity of adjacent uplands using ground squirrel colony size and burrow density as a proxy. Determine species response to predator control programs. Monitor disease to prevent population epidemic.
Status in Permit Area: 341,773 acres of modeled habitat (primary and secondary). 46,253 acres of modeled habitat currently protected in Type 1 open space. Species has been extirpated from the urbanized valley floor and brackish marshlands bordering the San Francisco Bay due to habitat removal/degradation and invasive species predation. Species persists in the foothills and mountain ranges throughout the county. There are 93 documented occurrences, with adult frogs observed in creeks from Upper Alameda Creek (Sunol Regional Wilderness) south to Henry W. Coe State Park, with half the occurrences in Henry W. Coe State Park, 24 on private property, and the remainder on public properties of City of San José, Santa Clara Valley Water District, and Santa Clara County. Species is reported to be declining in the permit area.	**Enhancement, Restoration and Creation:** All acquired/added habitat enhanced to ensure occupancy of 25% of ponds and wetlands in the entire Reserve System. 10 to 50 acres of wetlands/ 50 to 104 acres of ponds enhanced. 20 to 45 acres of perennial wetlands restored. 20 to 72 acres of ponds created. Conservation Strategy specifies increasing habitat, enhancing connectivity among existing ponds and wetlands, and contributing to species recovery. Sites will be targeted to reduce habitat fragmentation and promote genetic exchange within the population, and will include hydrologic, geomorphic, and soil conditions to ensure successful restoration/creation.	**Temporary:** 116 acres of modeled primary habitat (1%). 1,489 acres of modeled secondary habitat (<1%). 1,605 acres total (<1%), including 276 acres of critical habitat.	
Conditions on Covered Activities: Development guidelines for wetlands, ponds, and streams (breeding habitat) and valley oak and blue oak woodlands (upland habitat) will ensure that impacts from covered activities are minimized (Conditions 4, 5, 11, 12, 14). Project planning guidelines include maintenance of landscape connectivity, maintenance of site hydrology to the extent possible, and establishment of buffer/setback requirements. Construction guidelines include buffer zone establishment and fencing; staking of wetlands/ponds during construction; staff training by professional biologist; erosion control measures; and restrictions on seasonality of activities, vegetative management, use of heavy machinery, access points, and ground disturbance. Recreational use guidelines include leash law restrictions and public access limitations within reserve recreational use areas to prevent potential species impacts from domestic dogs (Condition 9).			
Net effects: Up to 415 acres (4%) of modeled primary habitat and 14,426 acres (4%) of modeled secondary habitat will be affected by covered activities. The Reserve System will protect and enhance a minimum of 1,430 acres of modeled primary habitat and 41,800 acres of modeled secondary habitat. This will result in an increase of 93% of protected modeled habitat and a total of 26% of modeled habitat protected as Type 1 open space. A minimum of 100 and up to 271 acres of aquatic habitat will be created/restored/enhanced. Some of these sites will be suitable species habitat. A network of core reserves will protect large blocks of breeding/non-breeding habitat. New linkages will be created in blocks of modeled habitat to facilitate dispersal and colonization throughout the permit area and movement between breeding sites (LAND-G2, OC1–5, WP4–7). 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) (POND-1–4, 10, 11, 13; GRASS-1, 2; LM-10–13; STUDIES-7, 8). Development guidelines will ensure that impacts from covered activities outside the Reserve System are minimized (Conditions 3, 4, 5, 9, 11, 12, 14). The Plan is likely to benefit the species in the permit area through habitat acquisition, habitat enhancement/restoration, and avoidance and minimization of direct impacts on the species.			

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
Foothill yellow-legged frog (*Rana boylii*)/(–/CSC)			
Status in Range: Species range extends from west of the crest of the Cascade mountains in Oregon south to the Transverse Ranges in Los Angeles County, and in the Sierra Nevada foothills south to Kern County, excluding coastal areas south of northern San Luis Obispo County and foothills area south of Fresno County, where the species is apparently extirpated. Known elevation range extends from near sea level to ~6,700 feet. Species is still common along the northern California coast as well as in suitable habitat in the Diablo Range in Alameda, western Stanislaus, Santa Clara, San Benito, and western Fresno Counties. Species is reported to be declining at a global scale, as well as within California.	**Land Acquisition:** 80 stream miles of modeled habitat acquired for Reserve System. 24 stream miles of modeled habitat added to Reserve System from existing open space. Protect occupied habitat in the Reserve System in at least four of the watersheds in Figure 3-6. Occupied habitat within the Reserve System is defined as perennial streams with an observation of egg masses by Year 45. Occupancy will be demonstrated upstream of dams that present permanent barriers to the species or on streams unaffected by dam operations and must be in both the Diablo Range and in the Santa Cruz Mountains. Target areas include streams that have, or historically had, perennial flows and cobblestone substrate.	**Permanent:** 1.9 stream miles of modeled primary habitat (1%). 4.8 stream miles of modeled secondary habitat (4%). 6.7 stream miles total (1%).	Assess habitat quality and conduct visual detection baseline surveys (to determine species presence/absence) in potential species habitat prior to Reserve System land acquisition. Document species baseline levels using in-depth population surveys, as warranted. Determine changes in number of egg masses (i.e., weekly egg mass surveys during peak egg-laying period) to evaluate species response to enhancement and restoration of stream habitat and riparian corridors (e.g., addition of cobblestone substrate, riparian plantings, livestock exclusion). Conduct a directed study to inform how and when reservoir releases should be implemented during egg-laying months. Determine species response to predator control programs. Monitor disease to prevent population epidemic. Evaluate species response to barrier removal.
Status in Permit Area: 690 stream miles of modeled habitat. 119 miles of modeled habitat currently protected in Type 1 open space (primary and secondary habitat). Species has been virtually extirpated from the lowland areas and from many of the perennial streams below major reservoirs; however, species remains abundant in the foothills and mountains of eastern Santa Clara County. Species is still found in the upper reaches of most perennial streams, including Coyote Creek and nearly all the streams of the Pajaro watershed. Species is reported to be declining within the permit area.	**Enhancement, Restoration, and Creation:** All stream miles of acquired/added habitat enhanced to ensure occupancy in at least three of the watersheds in the Reserve System. 1 to 10.4 stream miles restored. Conservation Strategy specifies targeting reaches of perennial streams above the Uvas, Calero, Chesbro, Anderson, or Coyote Reservoirs, Uvas Creek below Uvas Reservoir, Little Arthur Creek, Upper Penitencia Creek, Alamitos Creek, and Guadalupe Creek. Riparian vegetation will be seeded/planted to create structural diversity, provide overhead cover, and regulate stream temperature. Cobblestone substrate will be increased in _ stream miles within model habitat to increase breeding habitat suitability. Uvas Reservoir releases will be adjusted to create necessary seasonal flow regimes. Herbicide and other vegetative treatments will be selectively applied to avoid species impacts.	**Temporary:** 0.7 stream miles of modeled primary habitat (<1%). 1.3 stream miles of modeled secondary habitat (<1%). 2.0 stream miles total (<1%).	
Conditions on Covered Activities: Development and operations and maintenance guidelines will ensure that impacts from covered activities are avoided or minimized through maintenance of hydrologic conditions and protection of water quality (Condition 3), stream avoidance and minimization for in-stream projects (Condition 4), BMPs for in-stream operations and maintenance (Condition 5), rural development design requirements (Condition 7), preparation and implementation of a Reserve System recreation plan (Condition 9), and riparian setbacks (Condition 11). Conditions include but are not limited to: creation of landscape features to maintain preproject hydrograph, remove pollutants and sediments from surface runoff prior to stream entry, and reduce runoff velocity; development of construction sediment and erosion management plans; installation of fish passage mechanisms during in-stream work; and bank stabilization. Recreational use guidelines include leash law restrictions and public access limitations within reserve recreational use areas to prevent potential species impacts from domestic dogs (Condition 9).			
Net effects: Up to 8.7 stream miles (<1%) of modeled habitat will be affected by covered activities. The Reserve System will protect and enhance a minimum of 37 stream miles of modeled primary habitat and 67 stream miles of modeled secondary habitat. This will result in an 88% increase of protected modeled habitat as Type 1 open space and protection of a total of 32% of modeled habitat protected as Type 1 open space. Within the Reserve System a minimum of 1 and up to 10.4 stream miles will be restored. Some of these sites will be suitable species habitat. Engineered channels will be replaced to restore floodplain connectivity (STREAM-4, 5). Protection of streams with perennial flows will target reaches with high habitat value or restoration potential (LAND-R5). Restoration and enhancement of perennial streams (e.g., selective herbicide applications, riparian plantings, increase in cobblestone substrate, appropriate flow regimes) will ensure improvement of habitat quality and breeding success (LM-14; STREAM-2, 4, 5, 8; STUDIES-6). Development guidelines will ensure that impacts from covered activities outside the Reserve System are minimized (Conditions 3,-5, 7, 9, 11). The Plan is likely to benefit the species in the permit area through habitat acquisition, habitat enhancement/restoration, and avoidance and minimization of direct impacts on the species.			

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
Western pond turtle (*Clemmys marmorata*)/(–/CSC)			
Status in Range: Species range extends from most Pacific slope drainages from Klickitat County, Washington, along the Columbia River, to Arroyo Santa Domingo in northern Baja California. In California, it was historically present in most Pacific slope drainages between the Oregon and Mexican borders. Occurring in 90% of its historic California range in the Central Valley and west of the Sierra Nevada, its numbers have been greatly reduced. Species is reported to be declining at a global scale; however, the species status in California is unknown due to lack of data.	**Land Acquisition:** 27,000 acres modeled habitat acquired for Reserve System. 11,900 acres modeled habitat added to Reserve System from existing open space. Included in the acreages above are 50 to 104 acres of ponds, 10 to 50 acres of perennial wetlands, and 100 stream miles. 20% of ponds and wetlands in the entire Reserve System will be occupied by western pond turtles by Year 30. 25% of ponds and wetlands in the entire Reserve System will be occupied by western pond turtles by Year 45. Target areas include stream segments or ponds that currently provide or could provide high-quality basking, breeding, and nesting habitat. This includes land between existing ponds and wetlands that provide a linked matrix of pond, wetland, and upland habitat.	**Permanent:** 1,824 acres of modeled primary habitat (2%). 7,825 acres of modeled secondary habitat (3%). 9,649 acres total (3%).	Assess habitat quality and document baseline population levels in potential habitat within Reserve System acquisitions. Determine population response (i.e., changes in the average number of individuals basking) to enhancement and restoration of occupied habitat. Assess effects of habitat management (e.g., livestock exclusion) on nesting and basking habitat and determine population response.
Status in Permit Area: 314,916 acres of modeled habitat. 44,967 acres of modeled habitat currently protected in Type 1 open space (primary and secondary habitat). Species occurs throughout the Coyote Creek drainage from its upper reaches in Henry W. Coe State Park to the urbanized reaches in San José; however, the majority of known occurrences are in the southern half of the county, namely Uvas and Llagas Creeks where they enter reservoirs. Species status is unknown in the permit area due to lack of targeted studies; reported occurrences are thought to biased by incidental observation, consequently, occurrences may be more extensive throughout the permit area.	**Enhancement, Restoration, and Creation:** All acquired/added habitat enhanced to ensure occupancy of 25% of ponds and wetlands in the entire Reserve System. 50 to 104 acres of ponds enhanced. 20 to 72 acres of ponds created. 20 to 45 acres of perennial wetlands restored. 1 to 10.4 stream miles restored. Habitat management of riverine and riparian forest and scrub, wetlands, and ponds will increase the quality and quantity of species habitat within the permit area. Artificial basking substrate and woody debris will be installed to create suitable basking sites.	**Temporary:** 440 acres of modeled primary habitat (<1%). 986 acres of modeled secondary habitat (<1%). 1,426 acres total (<1%).	
Conditions on Covered Activities: Development guidelines for wetlands, ponds, and streams and valley oak and blue oak woodlands will ensure that impacts from covered activities are avoided and minimized (Conditions 4, 5, 11, 12 & 14). Project planning guidelines include maintenance of landscape connectivity, maintenance of site hydrology to the extent possible, and establishment of buffer/setback requirements. Construction guidelines include buffer zone establishment and fencing; staking of wetlands/ponds during construction; staff training by professional biologist; erosion control measures; and restrictions on seasonality of activities, vegetative management, use of heavy machinery, access points, and ground disturbance. Recreational use guidelines include leash law restrictions and public access limitations within reserve recreational use areas to prevent potential species impacts from domestic dogs (Condition 9).			
Net effects: 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 protect a minimum of 9,800 acres of modeled primary habitat and 29,100 acres of modeled secondary habitat. All habitat within Reserve System will be enhanced. This will result in an 87% increase of lands managed as species habitat and protection of a total of 27% of modeled habitat protected as Type 1 open space. Within the Reserve System 100 stream miles, a minimum of 50 and up to 104 acres of ponds, and a minimum of 10 and up to 50 acres of perennial wetlands will be protected. A minimum of 20 and up to 72 ponds will be created. A minimum of 20 and up 45 acres of perennial wetlands and minimum of 1 and up to 10.4 stream miles will be restored. A portion of these stream and aquatic natural community acquisition, creation, and restoration sites will provide suitable species habitat. A network of core reserves will protect large blocks of breeding/non-breeding habitat. New linkages will be created in blocks of modeled habitat to facilitate dispersal and colonization throughout the permit area and movement between breeding sites (LAND-G2, OC1–5, WP4–7). 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) (STREAM-1–3; LM-11–14; POND-1–4, 9–11, 13; GRASS-1, 2; STUDIES-7–9). Development guidelines will ensure that impacts from covered activities outside the Reserve System are minimized (Condition 9, 12, 14). The Plan is likely to benefit the species in the permit area through habitat acquisition, habitat enhancement/restoration, and avoidance and minimization of direct impacts on the species.			

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
Western burrowing owl (*Athene cunicularia hypugea*)/(MBTA/CSC)			
Status in Range: Species is found throughout western North American, west of the Mississippi River and south into Mexico. In California, species range extends through the lowlands south and west from north central California to Mexico, with small, scattered populations occurring in the Great Basin and the desert regions of the southwestern part of the state. Species is absent from the coast north of Sonoma County and from high mountain areas. Populations have been greatly reduced or extirpated from most of the San Francisco Bay Area and along the California coast to Los Angeles. The remaining major population densities are in the Central and Imperial Valleys. Species is reported to be declining at a global scale, as well as within California.	**Land Acquisition, Easement, or Management Agreement:** <ins>Overwintering Habitat</ins> 17,000 acres modeled overwintering habitat acquired for Reserve System. 4,310 acres modeled overwintering habitat added to Reserve System from existing open space. <ins>Nesting Habitat</ins> 5,300 acres occupied and potential nesting habitat managed with permanent long-term management plans by Year 45. A minimum of 600 of these 5,300 acres will be occupied nesting habitat acquired in fee title or easement for the Reserve System. The geographic breakdown of nesting habitat would include the following minimums: 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.	**Permanent:** 9,671 acres of modeled overwintering only habitat (7%). 198 acres of modeled occupied nesting habitat. 4,000 acres of modeled potential nesting habitat.	Assess habitat quality and document available nesting, foraging, and overwintering habitat within the Reserve System. Determine species movements and indentify habitat corridors during breeding and wintering seasons. Use multiple approaches (e.g., track nesting pairs, density and distribution of California ground squirrels) to determine species response (i.e., nesting success, site fidelity) to habitat protection and enhancement. Track species response to grassland management by monitoring California ground squirrel colonies to determine burrow and prey availability.
Status in Permit Area: 197,869 acres modeled habitat. 13,586 acres of modeled habitat currently protected in Type 1 open space. There are 25 extant species occurrences in the permit area. Many of these occurrence records include sitings of several breeding individuals over multiple years. Core populations of breeding and overwintering populations of western burrowing owls continue to be at the San José International Airport. Species is reported to be declining within the permit area.	**Enhancement, Restoration, and Creation:** All acquired/added/managed habitat enhanced. Conservation Strategy specifies using grassland management to enhance habitat quality through vegetation management, creating artificial burrows and increasing extent of ground squirrel colonies, encouraging the colonization of new areas, and ceasing rodenticide use to the extent possible.	**Temporary:** 762 acres of modeled overwintering habitat (<1%). 20 acres of modeled occupied nesting habitat (<1%). 604 acres of modeled potential nesting habitat (<1%).	
Conditions on Covered Activities: Development and operations and maintenance guidelines will ensure that impacts from covered activities are avoided or minimized (Condition 15). Species-specific surveys will be conducted during project planning phase, and potential impacts to occupied breeding habitat will be mapped. Preconstruction surveys will establish species presence/absence. Project monitoring will be coordinated with other regional efforts. Avoidance and minimization measures, including the establishment of a 250-ft buffer zone, will avoid all nest sites that could be disturbed by project construction throughout the breeding season. During the non-breeding season, active burrows will be avoided by the establishment of a 160-ft border, and exclusion doors will be put in place for 48 hours prior to excavation. All project monitoring will be conducted by a qualified biologist.			
Net effects: Up to 10,433 acres (8%) of modeled overwintering habitat, 218 acres of estimated occupied nesting habitat, and 4,604 acres of potential nesting habitat will be affected by covered activities. The Reserve System will protect or manage a minimum of 22,300 acres of species habitat (acquire 17,000 acres of modeled overwintering only and 600 acres of occupied nesting habitat , protect or manage another 4,700 acres of occupied or potential nesting habitat) An additional 4,310 acres of modeled overwintering habitat will be incorporated from existing open space. All habitat within the Reserve System or under long-term management will be enhanced. The Implementing Entity will maintain or increase the size of the breeding and overwintering burrowing owl population and increase the distribution of breeding and overwintering burrowing owls in the permit area and the expanded burrowing owl conservation area. New reserves will ensure protection of both breeding and overwintering habitat on the valley floor and in the Diablo Range (LAND G8-10). Habitat management will focus on enhancement of breeding habitat (i.e., vegetation management, artificial burrow creation, limiting rodenticide use, increased ground squirrel colonization) in four regions: North San José/Baylands, Gilroy, Morgan Hill, and South San José (GRASS-5, 6, 8, 9). Development guidelines will ensure that impacts from covered activities that occur outside the Reserve System are minimized (Condition 15). The Plan is likely to benefit the species in the permit area through habitat acquisition, habitat enhancement/restoration, and avoidance and minimization of direct impacts on the species.			

<table>
<tr><td>Species/Status (Federal/State/CNPS)[1]</td><td>Acquisition[2], Enhancement, Restoration, and Creation</td><td>Impacts[3,4]</td><td>Monitoring[5]</td></tr>
<tr><td colspan="4">Least Bell’s vireo (Vireo bellii pusillus)/(E, MBTA/E)</td></tr>
<tr><td>Status in Range: A migratory species that breeds in North America and overwinters primarily along the Pacific Coast in southern Mexico. Breeding range extends from north central to southwestern U.S. and into central Mexico. Additional breeding sites have been documented from southwestern California and northwestern Baja California to central South Dakota, east to Illinois and northwestern Indiana, south to the gulf coast and into southern Sonora. Recently, breeding individuals have been reported as far north as southern Santa Clara County along Llagas Creek and in southeastern Monterey, western Merced, and Stanislaus Counties, demonstrating that the species may be expanding back into its historical range. Species is reported to be declining at a global scale, as well as in California; however, there is recent evidence of range extensions in San Joaquin Valley.</td><td>Land Acquisition:
460acres modeled habitat acquired for Reserve System.
2 acres modeled habitat added to Reserve System from existing open space.
Included in the acreages above are the 290 to 592 acres of riparian forest and scrub and California alluvial sycamore woodland habitat that will be acquired to meet riparian natural community acquisition commitments.
Target areas include riparian woodland habitat in Uvas, Llagas, and Pacheco watersheds.</td><td>Permanent:
72 acres of modeled primary habitat (2%).</td><td rowspan="2">Survey riparian woodland during the nesting season to document and monitor species status. Evaluate species response to habitat enhancement and restoration. Document nesting success, once a population becomes established in the permit area.</td></tr>
<tr><td>Status in Permit Area:
3,097 acres of modeled habitat.
65 acres of modeled habitat currently protected in Type 1 open space.
Due to isolated, infrequent sighting of the species and lack of survey efforts, the extent of the species range in the permit area is not well understood. Species sightings have occurred along Llagas Creek between SR 152 and the Pajaro River, east of Gilroy (evidence of breeding, nest found) and Coyote Creek near Coyote Creek Golf Club (breeding behavior observed, no nest found). Species is poorly understood in the permit area, but may be increasing.</td><td>Enhancement, Restoration, and Creation:
All acquired/added habitat enhanced, including 290 to 592 acres of acquired riparian forest/scrub and California alluvial sycamore woodland. Fifty to 353 acres of riparian forest/scrub and California alluvial sycamore woodland will be restored.
Target areas include Uvas/Carnadero Creek, Llagas Creek between SR 152 and its confluence with Pajaro River, and sections of Pacheco Creek in Santa Clara County between Pacheco Lake and San Felipe Lake. Geomorphic and ecological stream functions, including floodplain benches, will be restored. All riparian mitigation will occur in Uvas, Llagas, and Pacheco watersheds. Native vegetation will be planted/seeded to promote continuity of riparian corridors and provide mosaic of successional stages. Predator control program, if needed, will be implemented.</td><td>Temporary:
43 acres of modeled primary habitat (1%).</td></tr>
<tr><td colspan="4">Conditions on Covered Activities: Development guidelines will ensure impacts are avoided and minimized (Condition 16). Surveys will identify and map nesting habitat and active nests for projects occurring in modeled habitat. If nesting habitat is identified, impacts will be avoided and minimized during the breeding season (March 15–July 31). Avoidance measures include relocating impacts at least 250 feet from modeled breeding habitat or conducting work outside of the breeding season. If impacts on least Bell’s vireo habitat (occupied or not) are not fully avoided by a 250-foot buffer, preconstruction surveys will be required. Preconstruction surveys will document species presence/absence and habitat use. Occupied nests and previous nesting sites (for up to 3 years) will be avoided during the breeding season (March 15–July 31) with a 250-foot buffer. Required buffers may be reduced on a case-by-case basis as evaluated by the Implementing Entity in coordination with the Wildlife Agencies. If a nest is found, the Wildlife Agencies will be notified immediately. All construction or maintenance personnel must participate in training lead by a qualified biologist.</td></tr>
<tr><td colspan="4">Net effects: The Plan does not authorize take of least Bell’s vireo in the form of direct injury or mortality. Loss of nests or eggs is also not authorized under the Plan. Up to 115 acres (4%) of modeled primary habitat will be affected by covered activities. The Reserve System will protect a minimum of 462 acres of modeled primary habitat. All species habitat within the Reserve System will be enhanced. This will result in a 711% increase of protected modeled habitat and a total of 17% of modeled habitat protected as Type 1 open space. To meet riparian natural community goals, a minimum of 290, and up 592, acres of riparian forest and scrub will be acquired and enhanced, and a minimum of 50 and up to 353 acres will be restored. Some of these sites may be suitable species habitat. New reserves will increase habitat connectivity by targeting areas along rivers (LAND–R2, R8). Habitat management will ensure improvement of habitat quality and favor increased reproductive success through riparian woodland and forest enhancement/restoration (e.g., predator control program, planting native vegetation) (LM-11; STREAM-2–5, 7). Development guidelines will ensure that impacts on this species from covered activities outside the Reserve System are avoided or minimized (Condition 16). The Plan is likely to benefit the species in the permit area through habitat acquisition, habitat enhancement/restoration, and avoidance and minimization of direct species impacts.</td></tr>
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Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
Tricolored blackbird (*Agelaius tricolor*)/(MBTA/CSC)			
Status in Range: Species is endemic to the west coast of North America, mostly in California. The breeding population is concentrated in the Central Valley with scattered sites occurring in Oregon, Washington, Nevada, and the western coast of Baja California. In California, the historic breeding range included Sacramento and San Joaquin Valleys, lowlands of the Sierra Nevada south to Kern County, the coast region from Sonoma County to the Mexican border, and sporadically on the Modoc Plateau. Species has experienced major declines since 1994. Species is reported to be declining at a global scale, as well as within California.	**Land Acquisition:** 19,000 acres modeled habitat acquired for Reserve System. 3,840 acres modeled habitat added to Reserve System from existing open space. Included in the acreages above are 50 to 104 acres of ponds and 10 to 50 acres of perennial wetlands. Target areas include suitable breeding habitat in dryland farming or ranching complexes in Coyote Valley and the Diablo Hills, prioritizing currently and recently occupied and historic breeding sites. In addition, foraging habitat will be acquired within 2 miles of known breeding sites.	**Permanent:** 276 acres of modeled primary habitat (3%). 10,317 acres of modeled secondary habitat (8%). 10,593 acres total (8%).	Assess habitat quality, species occupancy, and colony size of all suitable freshwater wetland or pond habitat in Reserve System. Determine breeding habitat connectivity in permit area. Evaluate species response to habitat enhancement, restoration, or creation. Monitor nesting colony response to nonnative plant removal. Determine need for predator control programs.
Status in Permit Area: 140,291 acres of modeled habitat. 11,037 acres of modeled habitat currently protected in Type 1 open space (primary and secondary habitat). Although consistently present in the permit area, species' distribution in permit area remains sporadic and ephemeral. There are few documented colony occurrences, comprising 150–200 individuals. Because species wanders considerably during the breeding season, individuals could successfully breed in the permit area if suitable breeding and/or foraging habitat were available. Breeding colonies often go unreported because of individuals' similar appearance to that of red-winged blackbird. Data are insufficient to characterize species status in the permit area.	**Enhancement, Restoration, and Creation:** All acquired/added habitat enhanced. 50 to 104 acres of ponds enhanced. 10 to 50 acres of perennial wetlands enhanced. 20 to 72 acres of ponds created. 20 to 45 acres of perennial wetlands restored. As part of the Conservation Strategy, private landowners will be offered incentives to ensure that farming and ranching practices support foraging habitat. Exclusion fencing will be installed to prevent entry of livestock and feral pigs into breeding habitat. Riparian vegetation will be planted to attract nesting birds. Engineered channels will be replaced where feasible.	**Temporary:** 93 acres of modeled primary habitat (1%). 768 acres of modeled secondary habitat (<1%). 861 acres total (<1%).	
Conditions on Covered Activities: Development and operations and maintenance guidelines ensure that impacts from covered activities are avoided or minimized (Condition 17). During the project planning phase, a qualified biologist will survey and map potential species nesting habitat. Potential nesting habitat identified by these or any other surveys, will be mapped and direct impacts to potential nesting habitat avoided and other impacts minimized. Avoidance measures include relocating impacts away from the potential nesting habitat. If a project is unable to avoid impacts on species nest colonies by locating construction and staging activities at least 250 feet from the outer edge of all hydric vegetation associated with the colony, preconstruction surveys will be required. Preconstruction surveys will conclude no more than two calendar days prior to construction. Covered activities must avoid species nesting colonies (currently occupied or occupied within the past 5 years) and associated habitat with a 250-ft no-activity buffer zone around the outer edge of all hydric vegetation associated with the colony. Required buffers may be adjusted on a case-by-case basis as evaluated by the Implementing Entity in coordination with the Wildlife Agencies. A construction monitor will be present during breeding season construction when an active colony is present.			
Net effects: No impacts are allowed to active tricolored blackbird colonies. The Plan does not authorize the removal of historic and active breeding sites. Up to 11,454 acres (8%) of modeled habitat will be affected by covered activities. The Reserve System will protect a minimum of 22,840 acres of modeled species habitat. All habitat within Reserve System will be enhanced. This will result in a 207% increase of lands managed as species habitat and a total of 24% of modeled habitat protected as Type 1 open space. A minimum of 50 and up to 104 acres of ponds and a minimum of 10 and up to 50 acres of perennial wetlands will be acquired and enhanced. A minimum of 20 and up to 72 acres of ponds will be created and a minimum of 20 and up to 45 acres of perennial wetlands will be restored. Some of these aquatic natural community acquisition, creation, and restoration sites will provide suitable species habitat. New reserves will ensure protection of at least four currently occupied or historic breeding sites and nearby foraging habitat (LAND WP 8). Land owners will be offered incentives to enhance breeding and foraging habitat on their property (POND-14, 15). Habitat management will focus on restoration and enhancement of ponds, freshwater marshes, and seasonal wetlands (e.g., fencing installation, restoration with native vegetation, replacement of engineered channels) to improve quality of breeding and foraging habitat (POND-1, 6, 8–10, 17, 18; STREAM-4). Development guidelines will ensure that impacts from covered activities that occur outside the Reserve System are minimized (Condition 17). The Plan is likely to benefit the species in the permit area through habitat acquisition, habitat enhancement/restoration, and avoidance and minimization of direct impacts on the species.			

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
San Joaquin kit fox (*Vulpes macrotis mutica*)/(E/T)			
Status in Range: Endemic to California, the historic range is estimated to have extended from Contra Costa and San Joaquin Counties in the north to Kern County in the south. Kit foxes currently inhabit some areas of the San Joaquin Valley floor and the surrounding foothills of the Coast Ranges, Sierra Nevada, and Tehachapi Mountains from Kern County north to Contra Costa, Alameda, and San Joaquin Counties. Known occurrences in Alameda, Contra Costa, Fresno, Kern, Kings, Madera, Merced, Monterey, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Santa Clara, Stanislaus, and Tulare Counties, with the largest extant populations in Kern County and San Luis Obispo County in the Carrizo Plain Area. Species is reported to be declining throughout its limited California range.	**Land Acquisition:** 4,100 of modeled secondary habitat acquired for Reserve System. Land acquisition adheres to species Recovery Plan. Focus on building connections between the more isolated satellite populations to contributes to *the Level A Strategy* to "work toward the establishment of a viable complex of kit fox populations (i.e., a viable metapopulation) on private and public lands throughout its geographic range". Plan supports the Habitat *Protection and Population Interchange Recovery Action xiv* to "Protect existing kit fox habitat in the northern, northeastern, and northwestern segments of their geographic range..." (U.S. Fish and Wildlife Service 1998). Target areas include north and south of SR 152 and east of SR 152/156 interchange that have the highest potential to support species.	**Permanent:** 198 acres of modeled secondary habitat (<1%). 28 acres of modeled secondary habitat (low use) (1%). 226 acres total (<1%).	Document and assess all potential den sites for occupancy and wildlife corridor use of SR 152 crossings (e.g., bridges, culverts). Evaluate distribution changes of California ground squirrels (prey base) in response to grassland management. Determine how SR 152 affects habitat connectivity using other terrestrial mammals' movement patterns and response to barriers.
Status in Permit Area: 40,892 acres of modeled habitat. 5,067 acres of modeled habitat currently protected in Type 1 open space (secondary habitat, secondary habitat low use). Four occurrence records for 1972–2002 report both den use and movement through the permit area. Genetic studies demonstrate that interbreeding occurs between individuals of the San Luis Reservoir population, southeast of the permit area, and those of Alameda and Costa Counties. It is assumed that the Pacheco–Santa Ana watershed in the southeastern part of Santa Clara County provides movement habitat between these two areas. Species status in the permit area is unknown due to lack of data.	**Enhancement, Restoration, and Creation:** All habitat enhanced. Specified management of native vegetation and limited the use of rodenticides will support sustainable prey population. Species passage will be improved across SR 152 with the placement of culverts or free span bridges and removal of median barriers. Fencing will be installed to encourage culvert and bridge use to avoid roadway crossings or to use sections without median barriers. Public education will be conducted to inform landowners on land use techniques that are more compatible with species movement and use.	**Temporary:** 46 acres of modeled secondary habitat (<1%). 6 acres of modeled secondary habitat (low use) (<1%). 52 acres total (<1%).	
Conditions on Covered Activities: Development guidelines ensure impacts are avoided or minimized (Condition 18). Surveys for potential breeding and denning sites will be required for projects occurring within modeled habitat as defined by this Plan. If the project does not fully avoid impacts on potential dens, preconstruction surveys will be required. Preconstruction surveys will conclude no more than two calendar days prior to construction. Preconstruction surveys written results will be submitted to USFWS and CDFG within two calendar days after survey completion and before ground disturbance start. If individuals or suitable dens are identified in survey area, minimization measures will be implemented (Condition 18). For example, during covered activities, dens will be monitored; unoccupied dens will be destroyed and use of occupied (non-natal) dens will be discouraged. During construction monitoring, a trained biologist will establish exclusion zones at least 50 feet for atypical and potential dens and at least 100 feet for known dens. If an occupied natal den is found, USFWS and CDFG will be notified immediately and the den will not be destroyed until the pups and adults have vacated and then only after further consultation with USFWS and CDFG. All construction or maintenance personnel must participate in training.			
Net effects: The Plan does not authorize take of San Joaquin kit fox in the form of injury or mortality. Up to 278 acres (<1%) of modeled habitat will be affected by covered activities. The Reserve System will protect a minimum of 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 and a total of 22% of modeled habitat protected as Type 1 open space and. Land acquisition and habitat enhancement includes elements of the *Level A* Strategy, *Population Interchange Recovery Action* xiv, and *Population Ecology Management Recovery Action i* of the species recovery plan. A network of core reserves and movement routes will protect a critical linkage for San Joaquin kit fox through the permit area to adjacent populations in Alameda and Contra Costa Counties (LAND-G9). Grassland and oak woodlands will be managed to support a sustainable prey population (GRASS-5, 6). Barriers to passage will be removed and structural improvements to facilitate movement will be implemented to improve species passage across SR 152 (LM-1–5). A public awareness campaign will encourage species-compatible land uses outside the Reserve System (GRASS-10). Development guidelines will ensure that impacts on this species from covered activities that occur outside the Reserve System are minimized (Condition 18). The Plan is likely to benefit the species in the permit area through habitat acquisition, habitat enhancement, and avoidance and minimization of direct impacts on the species.			

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
Tiburon Indian paintbrush (*Castilleja affinis* ssp. *neglecta*)/(E/T, 1B)			
Status in California: 9 known occurrences. Endemic to California, its range is approximately 30 by 70 miles (north–south), and occurs in Marin, Napa, and Santa Clara Counties. Species is reported to be stable throughout its limited California range.	**Land Acquisition:** 1 occurrence added from existing open space to Reserve System.	**Permanent:** 0 occurrences.	Evaluate species response to management and habitat enhancement (e.g., grazing regimes) annually and after significant events that may have strong effects on occurrence size (e.g. fire, severe weather). Identify limiting factors of occurrence expansion through targeted research. Develop appropriate monitoring protocols to study occurrence response to experimental grazing exclusion. Monitor potential threats (e.g. feral pigs, prescribed burns) to occurrence.
Status in Permit Area: 2 of 9 known occurrences. No occurrences currently protected in Type 1 open space. 1 occurrence is on private land as a mitigation site for expansion of the Kirby Canyon Landfill. The easement for this occurrence will expire in 2034. The site is currently monitored and managed by the Kirby Canyon Butterfly Trust. The second occurrence, located in the North Canyon, is on private land. At the time this Plan was being developed, the landowners was in the process of finalizing a conservation easement on the site.	**Enhancement, Restoration, and Creation:** Increase the size of occurrence to at least 2,000 individuals (number will be adjusted as necessary pending research carried out during Plan implementation to assure viable populations of this species). Conservation Strategy specifies identification through targeted studies of factors limiting the expansion of extant occurrences including management and microsite needs at all life stages. Effects of livestock grazing on species will be determined. Research results will be incorporated into management plans to mitigate or remove limiting factors.	**Temporary:** N/A	
Conditions on Covered Activities: Plant surveys will be required during appropriate season period (**Table 6-10**) if a project site occurs in an area mapped as land cover associated with Tiburon Indian paintbrush (**Table 3-6**; **Figure 3-10**). The condition of any new occurrences that may be found during the permit as a result of project surveys will be documented to ensure they are not affected. Exotic plants and recreational use will be controlled in reserves to benefit the species (Condition 9). Covered activities will avoid serpentine land cover types whenever feasible during project planning (Condition 13).			
Net effects: No occurrences of this species will be lost as a result of covered activities. The Reserve System will protect one occurrence that is now under easement which will expire in 2034. Plan implementation will result in 100% of known occurrence protected in Type 1 open space and species management will increase the total occurrence to at least 2,000. Management will enhance habitat quality for this species, and targeted research will be conducted on factors limiting the extent of current occurrences (STUDIES-5, 16). The Reserve System occurrence will be represented in a permanent conservation seed bank unless collection would pose a threat to the occurrence's continued existence (STUDIES-12). Development guidelines will ensure that impacts on currently undiscovered occurrences from covered activities outside the Reserve System are avoided (Condition 9). Guidelines for reserve management will ensure that recreational use will avoid species impacts (Condition 9). The Plan is likely to benefit the species in the Reserve System and throughout its range through habitat acquisition/enhancement/restoration, occurrence augmentation, and avoidance and minimization of direct impacts on the species.			

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
Coyote ceanothus (*Ceanothus ferrisiae*)/(E/–/1B)			
Status in California: 3 known occurrences. Species is endemic to Santa Clara County where it occurs in the Mt. Hamilton Range. Species is reported to be declining throughout its limited California range.	**Land Acquisition:** 5 occurrences acquired for Reserve System, 3 known, extant occurrences and 2 newly discovered occurrences.	**Permanent:** No more than 3,650 individuals or 5% of the Anderson Dam occurrence, whichever is less.	Conduct baseline surveys of known occurrences to determine occurrence size and demography upon land acquisition. Evaluate species response to management and habitat enhancement (e.g., controlled burns, `grazing regimes) annually and after significant events that may have strong effects on occurrence size (e.g., fire, severe weather). Target research to identify factors that limit occurrence expansion. Monitor potential threats (e.g., increases in reservoir levels) to occurrences as needed.
Status in Permit Area: 3 of 3 known occurrences. 0 occurrences currently protected in Type 1 open space All three existing occurrences are located in the Morgan Hill area; two are near Anderson Reservoir east of U.S. 101 and the third is on the west side of U.S. 101.	**Enhancement, Restoration, and Creation:** Up to 2 new occurrences created, in lieu of acquisition, if acquisition of naturally-occurring occurrences is infeasible. Increase each occurrence to at least 5,000 individuals (number will be adjusted as necessary pending research carried out during Plan implementation to assure viable populations of this species). Conservation strategy specifies targeting the east side of Coyote Valley to site new occurrence and increase species range. Targeted research will determine limiting factors in expansion of extant occurrences, appropriate and viable propagation or planting techniques, seed sampling and harvest techniques, and will indentify suitable locations and methods for occurrence establishment. Fire and alternative vegetative management in chaparral community will be used to maintain structural diversity and canopy gaps and promote regeneration to benefit species maintenance and regeneration. Success criteria will be developed by the Implementing Entity and approved by USFWS and CDFG prior to occurrence creation.	**Temporary:** No known occurrences (0%).	

Conditions on Covered Activities: Development guidelines will ensure that impacts from covered activities are minimized (Condition 20). Plant surveys will be required during appropriate season period (**Table 6-10**) if the project site occurs in an area mapped as land cover associated with coyote ceanothus (**Table 3-6**; **Figure 3-10**). Individuals to be removed by covered activities will be salvaged to the extent possible using appropriate plant salvage techniques and a new separate occurrence will be established in suitable habitat (Condition 19). The condition of each covered plant occurrence will be documented to ensure that occurrences are protected within the Reserve System are in as good or better condition than those lost to covered activities. Exotic plants and recreational use will be controlled within reserves to benefit the species (Condition 9). Covered activities will avoid serpentine land cover types whenever feasible during project planning (Condition 13). If serpentine cannot be avoided, minimization measures described in Condition 13 will be followed.

Net effects: No more than 3,650 individuals or 5% of the Anderson Dam occurrences (including both occurrences on either side of the Dam), whichever is less, will be affected by covered activities. The Reserve System will protect 3 currently unprotected known occurrences in the permit area and 2 new occurrences will be created if acquisition of any newly-discovered occurrences is infeasible (LAND-P1, STUDIES-13–15). This will result in protection of a 100% of known occurrences and a total of 5 occurrences in Type 1 open space. Management will enhance habitat quality for this species, and targeted research will be conducted on factors limiting the extent of current occurrences (STUDIES-5, 11; CHAP-1, 2; LM-8, 12). As part of species Recovery Plan implementation, a permanent conservation seed bank will be established in the National Collection of Endangered Plants. All known occurrences in the Reserve System will be represented in a permanent conservation seed bank unless collection would pose a threat to the occurrence's continued existence (STUDIES-12). The Plan is likely to benefit the species in the Reserve System and throughout its range through habitat acquisition/enhancement/restoration, occurrence augmentation, and avoidance and minimization of direct impacts on the species.

Table ES-2. Continued

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
Mt. Hamilton thistle (*Cirsium fontinale* var. *campylon*)/(–/–/1B)			
Status in California: 48 known occurrences. Species is endemic to the San Francisco Bay area, with two clusters of occurrences: one in the Mt, Hamilton Ranges, the other in the hills adjacent to the northern Santa Clara Valley, occurring on serpentine soils in seeps and springs and along intermittent and perennial streams, at elevations of 320–2,900 feet. Occurs in Santa Clara, Stanislaus, and Alameda Counties. Data are insufficient to characterize species status across its range; however, species is believed to be stable. Further study is necessary to confirm.	**Land Acquisition:** 20 known occurrences acquired for Reserve System. 2 known occurrences added to Reserve System from existing open space. 150 acres modeled habitat acres modeled habitat acquired for Reserve System. 60 acres modeled habitat added to Reserve System from existing open space. Target sites include drainages or spring systems that support species, such as, spring-fed serpentine drainages on Coyote Ridge that flow west into Coyote Creek, drainages that flow into San Felipe Creek, and other suitable habitat in the Santa Cruz Mountains between Calero County Park and Almaden Quicksilver County Park, and on Tulare Hill. An effort will be made to stratify protection and acquire sites on both sides of Coyote Valley to ensure geographic diversity in protected occurrences.	**Permanent:** 6 known occurrences; 26 acres of modeled primary habitat (5%).	Determine or estimate the number of individuals in known occurrences of covered plants and whether undiscovered occurrences occur on Reserve System acquisitions. Evaluate species response to management and habitat enhancement (e.g., grazing regimes) and after significant events that may have strong effects on occurrence size (e.g., fire, severe weather). Target research to identify factors that limit occurrence expansion. Monitor potential threats (e.g., insect herbivores, livestock grazing) to occurrences as needed.
Status in Permit Area: 40 of 48 known occurrences; 487 acres of modeled habitat. 2 occurrences currently protected in Type 1 open space. 55 acres of modeled habitat currently protected in Type 1 open space. There are occurrence estimates for 34 of the known occurrences of this species, from as early as 1983 up to as recently as 2006. These estimates range from 1 to 4,500 individuals, and the total estimated population of all occurrences is 28,933. The total number may be higher as species numbers are likely to fluctuate from year to year in response to annual fluctuations in rainfall and runoff into serpentine seeps.	**Enhancement, Restoration, and Creation:** Increase each occurrence to at least 2,000 individuals (number will be adjusted as necessary pending research carried out during Plan implementation to assure viable populations of this species). Conservation Strategy specifies determining limiting factors to occurrence expansion, including life stage and microsite needs, through targeted research. Livestock will be experimentally excluded to determine occurrence response. Hydrologic systems will be managed and maintained to provide species habitat.	**Temporary:** 4 acres of modeled primary habitat (<1%).	
Conditions on Covered Activities: Development guidelines will ensure that impacts from covered activities are minimized (Condition 20). Plant surveys will be required during the appropriate season period (**Table 6-10**) if the project site occurs in an area mapped as land cover associated with Mt. Hamilton thistle (**Table 3-6**; **Figure 3-10**). Occurrences to be removed by covered activities will be salvaged to the extent possible using appropriate plant salvage techniques and a new separate occurrence will be established in suitable habitat [not mentioned above] (Condition 19). The condition of each covered plant occurrence will be documented to ensure that occurrences are protected within the Reserve System are in as good or better condition than those lost to covered activities. Exotic plants and recreational use will be controlled within reserves to benefit the species (Condition 9). Covered activities will avoid serpentine land cover types whenever feasible during project planning (Condition 13). If serpentine cannot be avoided, minimization measures described in Condition 13 will be followed.			
Net effects: Up to 6 known occurrences and up to 30 acres (6%) of modeled habitat will be affected by covered activities. The Reserve System will protect a minimum of 210 acres of modeled habitat, including 22 known occurrences (LAND-P6). This will result in a 384% increase of lands managed as species habitat, 24 total occurrences managed in Type 1 open space, and 54% of modeled habitat protected as Type 1 open space. Habitat management includes maintaining hydrologic systems required for species habitat. Targeted studies will be conducted to test the effects on livestock on occurrences and to investigate factors that can be used to identify suitable locations for new occurrence establishment, propagation or planting techniques, alternative techniques for occurrence establishment, and factors limiting the extent of current occurrences (STUDIES-5, 16). As part of Recovery Plan implementation, a permanent conservation seed bank will be established in the National Collection of Endangered Plants. All known occurrences in the Reserve System will be represented in a permanent conservation seed bank unless collection would pose a threat to the occurrence's continued existence (STUDIES-12). The Plan is likely to benefit the species in the Reserve System and throughout its range through habitat acquisition/enhancement/restoration, occurrence augmentation, and avoidance and minimization of direct impacts on the species.			

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
Santa Clara Valley dudleya (*Dudleya abramsii* ssp. *setchellii*)/(E/–/1B)			
Status in California: 209 known occurrences. Species is endemic to Santa Clara County, found in the vicinity of Coyote Valley from San José south about 20 miles to San Martin, at elevations of 300–900 feet. Data are insufficient to characterize species status across its range; however, species is believed to be stable, although further study is necessary to confirm.	**Land Acquisition:** 44 known occurrences acquired for Reserve System. 11 known occurrences added to Reserve System from existing open space. Sites will be stratified to protect occurrence on both sides of Coyote Valley to ensure geographic diversity in protected occurrences. This includes the majority of known occurrences along Coyote Ridge, in the Santa Teresa Hills and Tulare Hill (4), west of Calero County Park (2), and north of Morgan Hill (1). Incorporation of portions of Santa Teresa, Calero, and Almaden Quicksilver County Parks into the Reserve System add 10 occurrences for existing open space to be protected as Type 1 open space. The protected land will include a buffer of 150 meters (500 feet), if feasible, around each occurrence to reduce external influences and allow expansion of the occurrence.	**Permanent:** 11 known occurrences.	Conduct baseline occurrence surveys in all suitable habitat to evaluate known occurrences and document new occurrences. Delineate operational "boundary" for discrete occurrences for monitoring and management purposes. Evaluate species response to management and habitat enhancement (e.g., grazing regimes) annually and after significant events that may have strong effects on occurrence size (e.g., fire, severe weather). Target research to identify factors that limit occurrence expansion. Monitor potential threats (e.g., fires, livestock grazing) to occurrences as needed.
Status in Permit Area: 207 of 209 known occurrences. 2 occurrences currently protected in Type 1 open space. Occurrence estimates are only available for 46 occurrences that total 72,500 individuals.	**Enhancement, Restoration, and Creation:** Increase each occurrence to at least 2,000 individuals (number will be adjusted as necessary pending research carried out during Plan implementation to assure viable populations of this species). Conservation Strategy specifies seeding or transplanting adults from large occurrences to suitable unoccupied rock outcrops in existing occurrences. Limiting factors to occurrence expansion, including life stage and microsite needs, will be determined through targeted research. Livestock will be experimentally excluded to determine occurrence response.	**Temporary:** N/A	
Conditions on Covered Activities: Development guidelines will ensure that impacts on Santa Clara Valley dudleya from covered activities are minimized (Condition 20). Plant surveys will be required during the appropriate season period (**Table 6-10**) if the project site occurs in an area mapped as land cover associated with Santa Clara Valley dudleya (**Table 3-6**; **Figure 3-10**). Occurrences to be removed by covered activities will be salvaged to the extent possible using appropriate plant salvage techniques, and a new separate occurrence will be established in suitable habitat (Condition 19). The condition of each covered plant occurrence will be documented to ensure that occurrences are protected within the Reserve System are in as good or better condition than those lost to covered activities. Exotic plants and recreational use will be controlled within reserves to benefit the species (Condition 9). Covered activities will avoid serpentine land cover types whenever feasible during project planning (Condition 13). If serpentine cannot be avoided, minimization measures described in Condition 13 will be followed.			
Net effects: Up to 11 known will be affected by covered activities. The Reserve System will protect 55 known occurrences in permit area (LAND-P2). This will result in 57 occurrences protected and managed in Type 1 open space. Management will enhance habitat quality for this species, and targeted studies will be conducted on factors limiting the extent of current occurrences in order to increase each occurrence to at least 2,000 individuals (STUDIES-5, 16). As part of Recovery Plan implementation, a permanent conservation seed bank will be established in the National Collection of Endangered Plants. All known occurrences in the Reserve System will be represented in a permanent conservation seed bank unless collection would pose a threat to the occurrence's continued existence (STUDIES-12). The Plan is likely to benefit the species in the Reserve System and throughout its range through habitat acquisition/enhancement/restoration, occurrence augmentation, and avoidance and minimization of direct impacts on the species.			

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
Fragrant fritillary (*Fritillaria liliacea*)/(–/–/1B)			
Status in California: 59 known occurrences. Species is endemic to western central California, ranging from Sonoma and Solano Counties south to Monterey County.	**Land Acquisition:** 3 occurrences acquired for Reserve System. 1 known occurrence added to Reserve System from existing open space. 23,000 acres modeled habitat acquired for Reserve System. 4,000 acres modeled habitat added to Reserve System from existing open space. 3 unprotected occurrences will be targeted for acquisition. Two occurrences will be protected along Coyote Ridge southeast of Metcalf Canyon and northeast of Morgan Hill. The third occurrence will be located outside of Metcalf Canyon, preferably east of the valley. A fourth occurrence in Calero County Park will be incorporated into the Reserve System as Type 1 open space. The protected land will include a 500-foot buffer around each occurrence to reduce external influences and allow expansion of the occurrence if biologically feasible and appropriate.	**Permanent:** 1 known occurrence; 550 acres of modeled primary habitat (6%). 2,729 acres of modeled secondary habitat (2%). 3,279acres total (2%).	Determine or estimate the number of individuals in known occurrences of covered plants and whether undiscovered occurrences occur on Reserve System acquisitions. Evaluate species response to management and habitat enhancement (e.g., grazing regimes) and after significant events that may have strong effects on occurrence size (e.g., fire, severe weather). Target research to identify factors that limit occurrence expansion. Monitor potential threats (e.g., fires, livestock grazing) to occurrences as needed.
Status in Permit Area: 8 of 59 known occurrences; 165,455 acres modeled habitat. 0 occurrences currently protected in Type 1 open space; 16,371 acres of modeled habitat currently protected in Type 1 open space (primary and secondary habitat). 35 occurrences have size estimates, for a total of 16,383 individuals.	**Enhancement, Restoration, and Creation:** Conservation Strategy specifies identification of factors limiting occurrence expansion, factors affecting establishment and maintenance of new occurrences, life stage and specific microsite needs, and effects of land management on occurrence establishment and survival.	**Temporary:** 59 acres of modeled primary habitat (<1%). 655 acres of modeled secondary habitat (<1%). 714 acres total (<1%).	
Conditions on Covered Activities: Development guidelines will ensure that impacts from covered activities are minimized. Plant surveys will be required during the appropriate season period (**Table 6-10**) if the project site occurs in an area mapped as land cover associated with fragrant fritillary (**Table 3-6**; **Figure 3-10**). Occurrences to be removed by covered activities will be salvaged to the extent possible using appropriate plant salvage techniques and a new separate occurrence will be established in suitable habitat [not mentioned above] (Condition 19). The condition of each covered plant occurrence will be documented to ensure that occurrences are protected within the Reserve System are in as good or better condition than those lost to covered activities. Exotic plants and recreational use will be controlled in reserves to benefit the species (Condition 9). Covered activities will avoid serpentine land cover types whenever feasible during project planning (Condition 13). If serpentine cannot be avoided, minimization measures described in Condition 13 will be followed.			
Net effects: Up to 1 known occurrence and 3,993 acres (2%) of modeled habitat will be affected by covered activities. The Reserve System will protect a minimum of 27,000 acres of modeled habitat, including four known occurrences (LAND-P8). This will result in a 226% increase of lands managed as species habitat, protection and management of a total of 4 occurrences, and 26% of modeled habitat as Type 1 open space. Targeted studies will identify factors limiting occurrence expansion and test the effects of livestock grazing (STUDIES-5, 16). All known occurrences in the Reserve System will be represented in a permanent conservation seed bank unless collection would pose a threat to the occurrence's continued existence (STUDIES-12). The Plan is likely to benefit the species in the Reserve System and throughout its range through habitat acquisition/enhancement/restoration, occurrence augmentation, and avoidance and minimization of direct impacts on the species.			

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
Loma Prieta hoita (*Hoita strobilina*)/(–/–/1B)			
Status in California: 26 known occurrences. Endemic to California, species occurs primarily in the Santa Cruz Mountains of Santa Clara and Santa Cruz Counties. The species also occurs in the Diablo Range in Santa Clara, Alameda, and Contra Costa Counties. Data are insufficient to determine global and regional status.	**Land Acquisition:** 1 known occurrence acquired for Reserve System. 3 known occurrences added to Reserve System from existing open space. 10,000 acres modeled habitat acquired for Reserve System. 4,100 acres modeled habitat added to Reserve System from existing open space. Targeted acquisition includes an occurrence on the east side of the Santa Clara Valley, just east of US 101, south of Motorcycle Park. Three additional occurrences will be added to the Reserve System as Type 1 open space through the incorporation of Santa Teresa, Almaden Quicksilver, and Calero County Parks. All occurrences will protect a biologically appropriate buffer around known occurrence to reduce external influences and allow for occurrence expansion.	**Permanent:** No known occurrences; 2,117 acres of modeled primary habitat (2% 266 acres of modeled secondary habitat (1%). 2,383 acres total (2%).	Determine or estimate the number of individuals in known occurrences of covered plants and whether undiscovered occurrences occur on Reserve System acquisitions. Evaluate species response to management and habitat enhancement (e.g., grazing regimes) and after significant events that may have strong effects on occurrence size (e.g., fire, severe weather). Target research to identify factors that limit occurrence expansion. Monitor potential threats (e.g., feral pig rooting) to occurrences as needed.
Status in Permit Area: 14 of 26 known occurrences; 121,871 acres of modeled habitat. 1 occurrence currently protected in Type 1 open space. 17,276 acres of modeled habitat currently protected in Type 1 open space (primary and secondary habitat).	**Enhancement, Restoration, and Creation:** Conservation Strategy specifies identifying factors limiting the expansion of known occurrences, life stage and specific microsite needs, and effects of land management on occurrence establishment and survival.	**Temporary:** 413 acres of modeled primary habitat (<1%). 60 acres of modeled secondary habitat (<1%). 473 acres (<1%).	
Conditions on Covered Activities: Development guidelines will ensure that impacts from covered activities are minimized (Condition 20). Plant surveys will be required during the appropriate season period (**Table 6-10**) if the project site occurs in an area mapped as land cover associated with Loma Prieta hoita (**Table 3-6**; **Figure 3-10**). Occurrences to be removed by covered activities will be salvaged to the extent possible using appropriate plant salvage techniques and a new separate occurrence will be established in suitable habitat (Condition 19). The condition of each covered plant occurrence will be documented to ensure that occurrences are protected within the Reserve System are in as good or better condition than those lost to covered activities. Exotic plants and recreational use will be controlled in reserves to benefit the species (Condition 9).			
Net effects: No known occurrences and up to 2,856 acres (2%) of modeled habitat will be affected by covered activities. The Reserve System will protect a minimum of 14,100 acres of modeled habitat, including four known occurrence (LAND-P12). This will result in an 82% increase of lands managed as species habitat, a total of 5 managed occurrences in Type 1 open space, and 26% of modeled habitat protected as Type 1 open space. Targeted studies will identify factors limiting occurrence expansion (STUDIES-5). All known occurrences in the Reserve System will be represented in a permanent conservation seed bank unless collection would pose a threat to the occurrence's continued existence (STUDIES-12). The Plan is likely to benefit the species in the Reserve System and throughout its range through habitat acquisition/enhancement/restoration, occurrence augmentation, and avoidance and minimization of direct impacts on the species.			

<table>
<tr><td>Species/Status (Federal/State/CNPS)[1]</td><td>Acquisition[2], Enhancement, Restoration, and Creation</td><td>Impacts[3,4]</td><td>Monitoring[5]</td></tr>
<tr><td colspan="4">Smooth lessingia (Lessingia micradenia var. glabrata)/(–/–/1B)</td></tr>
<tr><td>Status in California:
39 known occurrences.
Species is endemic to Santa Clara County on the eastern slopes of the Santa Cruz Mountains and the hills adjacent to the Santa Clara Valley. Data are insufficient to determine global and regional status; however, all documented occurrences are presumed to be extant.</td><td>Land Acquisition:
7 known or new occurrences acquired for Reserve System,
5 known occurrences added to Reserve System from existing open space.
12 new occurrences (if discovered) acquired for Reserve System.
4,000 acres modeled habitat acquired for Reserve System.
1,100 acres modeled habitat added to Reserve System from existing open space.
Targeted acquisition are located on the west side of US 101 in the Santa Cruz Mountains foothills, on serpentine areas between Tulare Hill and Mount Madonna County Park. Two additional occurrences will be added to the Reserve System as Type 1 open space from Calero and Mount Madonna County Parks. All occurrences will be protected by a 500-foot buffer around occurrences to reduce external influences and allow for occurrence expansion.</td><td>Permanent:
6 known occurrences;
550 acres of modeled primary habitat (5%).</td><td rowspan="2">Determine or estimate the number of individuals in known occurrences of covered plants and whether undiscovered occurrences occur on Reserve System acquisitions.
Evaluate species response to management and habitat enhancement (e.g., grazing regimes) and after significant events that may have strong effects on occurrence size (e.g., fire, severe weather).
Target research to identify factors that limit occurrence expansion.
Monitor potential threats (e.g., fires, livestock grazing) to occurrences as needed.</td></tr>
<tr><td>Status in Permit Area:
39 of 39 known occurrences; 10,491 acres modeled habitat.
3 occurrences currently protected in Type 1 open space;
1,268 acres of modeled habitat currently protected in Type 1 open space.
16 of the 33 known occurrences have size estimates totaling 95,213.</td><td>Enhancement, Restoration, and Creation:
Up to 12 occurrences created, in lieu of acquisition, if acquisition of naturally-occurring occurrences is infeasible.
Increase the size of each occurrence to at least 2,000 individuals.
Conservation Strategy specifies targeted research to identify limiting factors to occurrence expansion, including life stage and microsite needs, and effects of land management on occurrence establishment and survival. Livestock will be experimentally excluded to determine occurrence response. Success criteria will be developed by the Implementing Entity and approved by USFWS and CDFG prior to occurrence creation.</td><td>Temporary:
68 acres of modeled primary habitat (<1%).</td></tr>
<tr><td colspan="4">Conditions on Covered Activities: Development guidelines will ensure that impacts from covered activities are minimized (Condition 20). Plant surveys will be required during the appropriate season period (Table 6-10) if the project site occurs in an area mapped as land cover associated with smooth lessingia (Table 3-6; Figure 3-10). Occurrences to be removed by covered activities will be salvaged to the extent possible using appropriate plant salvage techniques and a new separate occurrence will be established in suitable habitat (Condition 19). The condition of each covered plant occurrence will be documented to ensure that occurrences are protected within the Reserve System are in as good or better condition than those lost to covered activities. Exotic plants and recreational use will be controlled in reserves to benefit the species (Condition 9). Covered activities will avoid serpentine land cover types whenever feasible during project planning (Condition 13). If serpentine cannot be avoided, minimization measures described in Condition 13 will be followed.</td></tr>
<tr><td colspan="4">Net effects: Up to 6 known occurrences and 618 acres (6%) of modeled habitat will be affected by covered activities. The Reserve System will protect a minimum of 5,100 acres of modeled habitat, including 12 known occurrences (LAND-P7). At least 12 new occurrences will be found and acquired or established in suitable unoccupied habitat. This will result in a 427% increase of lands managed as species habitat, protection and management of 27 occurrences in Type 1 open space, and protection of a total of 61% of modeled habitat as Type 1 open space. Targeted studies will be conducted to identify factors limiting the extent of current occurrences and to test the effects of livestock grazing on occurrences (STUDIES-5, 14, 16). As part of Recovery Plan implementation, a permanent conservation seed bank will be established in the National Collection of Endangered Plants. All known occurrences in the Reserve System will be represented unless collection would pose a threat to the occurrence’s continued existence (STUDIES-12). The Plan is likely to benefit the species in the Reserve System and throughout its range through habitat acquisition/enhancement/restoration, occurrence augmentation, and avoidance and minimization of direct impacts on the species.</td></tr>
</table>

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]
Metcalf Canyon jewelflower (*Streptanthus albidus* ssp. *albidus*)/(FE/1B)			
Status in California: 11 known occurrences. Species is endemic to Santa Clara County, CA, with its range extending approximately 20 miles from San José south to Anderson Lake. Species is reported to be declining throughout its limited California range.	**Land Acquisition:** 3 known occurrences acquired for Reserve System. 10 new occurrences, if found, acquired for Reserve System. 3,200 acres modeled habitat acquired for Reserve System. 1,000 acres modeled habitat added to Reserve System from existing open space. Acquire additional land on north side of Tulare Hill for reintroduction site. The protected land will include a buffer of 150 meters (500 feet), if feasible, around each occurrence to reduce external influences and allow expansion of the occurrence. 68 occurrences of an unidentified jewelflower on Coyote Ridge near Metcalf Canyon will likely be protected in the Reserve System. Due to the proximity of known occurrences, some are likely to be Metcalf Canyon jewelflower.	**Permanent:** 2 known occurrences; 550 acres of modeled primary habitat (7%).	Conduct baseline occurrence surveys in all suitable habitat to evaluate known occurrences and document new occurrences. Evaluate species response to management and habitat enhancement (e.g., grazing regimes) annually and after significant events that may have strong effects on occurrence size (e.g., fire, severe weather). Target research to identify factors that limit occurrence expansion. Monitor potential threats (e.g., fires, livestock grazing) to occurrences as needed.
Status in Permit Area: 10 of 11 known occurrences; 8,105 acres modeled habitat. 1 occurrence currently protected in Type 1 open space; 984 acres of modeled habitat currently protected in Type 1 open space.	**Enhancement, Restoration, and Creation:** Up to 10 new occurrences created, in lieu of acquisition, if acquisition of naturally-occurring occurrences is infeasible. Increase each occurrence to at least 2,000 individuals (number will be adjusted as necessary pending research carried out during Plan implementation to assure viable populations of this species). Conservation Strategy specifies targeting Tulare Hill on west side of valley for occurrence creation. Targeted research will be conducted to identify limiting factors in expansion of extant occurrences, appropriate and viable propagation or planting techniques, and seed sampling and harvest techniques, as well as to determine suitable locations and methods for occurrence establishment. Success criteria will be developed by the Implementing Entity and approved by USFWS and CDFG prior to occurrence creation.	**Temporary:** 62 acres of modeled primary habitat (<1%).	
Conditions on Covered Activities: Development guidelines will ensure that impacts from covered activities are minimized (Condition 20). Plant surveys will be required during the appropriate season period (**Table 6-10**) if the project site occurs in an area mapped as land cover associated with Metcalf Canyon jewelflower (**Table 3-6**; **Figure 3-10**). Occurrences to be removed by covered activities will be salvaged to the extent possible using appropriate plant salvage techniques, and a new separate occurrence will be established in suitable habitat (Condition 19). The condition of each covered plant occurrence will be documented to ensure that occurrences are protected within the Reserve System are in as good or better condition than those lost to covered activities. Exotic plants and recreational use will be controlled within reserves to benefit the species (Condition 9). Covered activities will avoid serpentine land cover types whenever feasible during project planning (Condition 13). If serpentine cannot be avoided, minimization measures described in Condition 13 will be followed.			
Net effects: Up to 2 known occurrences and 612 acres (8%) of modeled habitat will be affected by covered activities. The Reserve System will protect 4,200 acres of modeled habitat, including 3 of 10 known occurrences that are currently unprotected in the permit area. At least 10 new occurrences will be found and acquired and/or created in suitable unoccupied habitat (LAND-P3, P4). This will result in a 427% increase of lands managed as species habitat, protection of a total of 4 known occurrences in Type 1 open space and 10 newly discovered and/or created occurrences, and protection of 64% of modeled habitat as Type 1 open space. Conservation Strategy implementation will increase the total number of extant occurrences to 21 in California, including 14 occurrences protected in Type 1 open space. Management will enhance habitat quality for this species, and targeted studies will be conducted on factors limiting the extent of current occurrences (STUDIES 5, 14, 15, 17). As part of Recovery Plan implementation, a permanent conservation seed bank will be established in the National Collection of Endangered Plants. All known occurrences in the Reserve System will be represented unless collection would pose a threat to the occurrence's continued existence (STUDIES-12).The Plan is likely to benefit the species in the Reserve System and throughout its range through habitat acquisition/enhancement/restoration, occurrence augmentation, and avoidance and minimization of direct impacts on the species.			

<table>
<tr><td>Species/Status (Federal/State/CNPS)[1]</td><td>Acquisition[2], Enhancement, Restoration, and Creation</td><td>Impacts[3,4]</td><td>Monitoring[5]</td></tr>
<tr><td colspan="4">Most beautiful jewelflower (Streptanthus albidus ssp. peramoenus)/(–/–/1B)</td></tr>
<tr><td>Status in California:
86 known occurrences.
Species is endemic to California, found in the northern South Coast Ranges of Contra Costa, Alameda, and Santa Clara Counties. Species is reported to be declining throughout its limited California range.</td><td>Land Acquisition:
9 known occurrences acquired for Reserve System.
8 known occurrences added to the Reserve System from existing open space.
4,000 acres modeled habitat acquired for Reserve System.
1,700 acres modeled habitat added to Reserve System from existing open space.
Target areas include suitable habitat and occurrences along Coyote Ridge, in Santa Teresa Hills, west of Chesbro Reservoir, near Morgan Hill and in the southern end of the permit area in the Santa Cruz Mountain foothills. Eight occurrences will be added to the Reserve System from Alamaden Quicksilver, Calero, and Santa Teresa County Parks as Type 1 open space. All occurrences will be buffered by 150 meters (500 feet) to reduce external influences and allow expansion of the occurrence. 68 occurrences of an unidentified jewelflower on Coyote Ridge near Metcalf Canyon will likely be acquired for Reserve System. Due to the proximity of known occurrences, some are likely to be most beautiful jewelflower.</td><td>Permanent:
6 known occurrences;
550 acres of modeled primary habitat (4%).</td><td rowspan="2">Determine or estimate the number of individuals in known occurrences of covered plants and whether undiscovered occurrences occur on Reserve System acquisitions.
Evaluate species response to management and habitat enhancement (e.g., grazing regimes) and after significant events that may have strong effects on occurrence size (e.g., fire, severe weather).
Target research to identify factors that limit occurrence expansion.
Monitor potential threats (e.g., fires, livestock grazing) to occurrences as needed.</td></tr>
<tr><td>Status in Permit Area:
39 of 86 known occurrences; 14,362 acres modeled habitat.
3 occurrences currently protected in Type 1 open space; 1,500 acres of modeled habitat currently protected in Type 1 open space (primary and secondary habitat).</td><td>Enhancement, Restoration, and Creation:
Increase each occurrence to at least 2,000 individuals (number will be adjusted as necessary pending research carried out during Plan implementation to assure viable populations of this species).
Conservation Strategy specifies investigation of species reproductive biology and demography. Targeted research will identify factors limiting occurrence expansion, life stage and specific microsite needs, and effects of land management on occurrence establishment and survival.</td><td>Temporary:
92 acres of modeled primary habitat (<1%).</td></tr>
<tr><td colspan="4">Conditions on Covered Activities: Development guidelines will ensure that impacts from covered activities are minimized (Condition 20). Plant surveys will be required during the appropriate season period (Table 6-10) if the project site occurs in an area mapped as land cover associated with most beautiful jewelflower (Table 3-6; Figure 3-10). Occurrences to be removed by covered activities will be salvaged to the extent possible using appropriate plant salvage techniques and a new separate occurrence will be established in suitable habitat (Condition 19). The condition of each covered plant occurrence will be documented to ensure that occurrences are protected within the Reserve System are in as good or better condition than those lost to covered activities. Exotic plants and recreational use will be controlled in reserves to benefit the species (Condition 9). Covered activities will avoid serpentine land cover types whenever feasible during project planning (Condition 13). If serpentine cannot be avoided, minimization measures described in Condition 13 will be followed.</td></tr>
<tr><td colspan="4">Net effects: Up to 6 known occurrences and 642 acres (4%) of modeled primary habitat will be affected by covered activities. The Reserve System will protect a minimum of 5,700 acres of modeled habitat, including 17 known occurrences (LAND-P5). This will result in a 380% increase of lands managed as species habitat and protection of a total of 20 occurrences as Type 1 open space, and a total of 50% of modeled habitat protected as Type 1 open space. Targeted studies will identify factors limiting the extent of current occurrences and suitable propagation or planting techniques for new occurrence establishment (STUDIES-5, 14, 17). As part of Recovery Plan implementation, a permanent conservation seed bank will be established in the National Collection of Endangered Plants of all known occurrence is Reserve System (STUDIES-12).The Plan is likely to benefit the species in the Reserve System and throughout its range through habitat acquisition/enhancement/restoration, occurrence augmentation, and avoidance and minimization of direct impacts on the species.</td></tr>
</table>

Species/Status (Federal/State/CNPS)[1]	Acquisition[2], Enhancement, Restoration, and Creation	Impacts[3,4]	Monitoring[5]

[1] Status

Federal

E Federally Listed as Endangered
T Federally Listed as Threatened
MBTA Migratory Bird Treaty Act

State

E State Listed as Endangered
T State Listed as Threatened
SR State Listed as Rare
CSC California Special Concern Species
FP Fully Protected

California Native Plant Society

1B Rare, Threatened, or Endangered in California and Elsewhere

[2] All land acquired as part of Reserve System will be protected as Type 1 open space. This includes land added to the Reserve System from existing open space. For many covered plant species, additional impacts are allowed under certain circumstances if additional occurrences are discovered during the permit term. See Table 5-16 for details on occurrence acquisition requirements if additional occurrences are discovered and impacts require additional protection. [3] Habitat was only modeled within the permit area. When models were developed, impacts are provided in terms of percent of modeled habitat. See Section 5.3.1 and plant species-specific conservation strategy discussions (Sections 5.4.12–5.4.21) for details for plant acquisition requirements (i.e., condition, location, timing).

[4] It is expected that new occurrences of many of the covered plants will be discovered both within the impact areas and the Reserve System. In many cases, it is warranted to allow additional impacts to covered plants beyond the occurrences known at this time, as long as new occurrences are found and protected in the Reserve System before the impacts occur. A summary of number of known occurrences required in the permit area, increased take limit, and required number of occurrences protected in the Reserve System is provided in **Table 5-16**.

[5] For complete suggested monitoring tasks, see Chapter7, Section 7.3.3.

Acknowledgements

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Chapter 1
Introduction

Preparation of this document was funded in part from the Cooperative Endangered Species Conservation Fund (Section 6) Planning Grants administered by the California Department of Fish and Game through Agreements # P0630005, P0630017 and P0882006. The Agreements, which are for use of $1,107,868 of federal funding, are for several work products including this document.

1.1 Overview

The Santa Clara Valley Habitat Plan (or Plan) is intended to provide an effective framework to protect, enhance, and restore natural resources in specific areas of Santa Clara County, while improving and streamlining the environmental permitting process for impacts on threatened and endangered species. The entities listed below have prepared this Plan.

- County of Santa Clara (County).
- City of San José.
- City of Morgan Hill.
- City of Gilroy.
- Santa Clara Valley Water District (SCVWD).
- Santa Clara Valley Transportation Authority (VTA).

These entities are collectively referred to as the *Local Partners*. The Local Partners intend the Plan to allow for reasonable development, growth, and needed infrastructure construction and maintenance while accommodating the Plan's conservation goals and complying with state and federal regulatory requirements. The Local Partners are collectively known as the *Permittees*.

1.1.1 Mission Statement

The Local Partners and key stakeholders, participating in a goal-setting process, developed a set of broad program goals that collectively serve as the mission statement for this Plan. The program goals are divided into five themes.

Biological Resources and Conservation

- Protect, enhance, and restore ecosystem integrity and functionality for threatened and endangered species.
- Enhance the diversity of plant and animal communities.
- Conserve habitat and contribute to the recovery of species listed or likely to be listed under the federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA).

Multi-Purpose and Benefit Plan

- Preserve and enhance watersheds to protect beneficial uses of water and to provide flood protection for Santa Clara County.
- Provide appropriate levels of public access in habitat areas in a manner compatible with conservation goals.
- Facilitate economic growth compatible with approved local land use plans.
- Preserve agricultural viability.
- Integrate the strategies of the Plan with public and private potential partners wherever possible.
- Develop a Plan with a variety of implementation measures to attract multiple funding sources.
- Allocate costs of the Plan equitably among the Local Partners.
- Develop Plan strategies that build on the governmental capacities of all Local Partner jurisdictions.

Public Participation

- Provide an open public process in developing and implementing the Plan.

Regulatory Compliance

- Provide a comprehensive, coordinated, and standardized mitigation and compensation plan such that regulations on public and private actions will be applied equally and consistently, reducing delays, expenses, and regulatory duplication.
- Streamline the endangered species permitting process for the covered activities.

Effective and Efficient Implementation

- Provide a basis for the Permittees to obtain endangered species permits for public projects including those associated with uninterrupted water supply, flood protection, watershed activities, recreation, transportation, and other government functions.
- Provide a basis for private projects to gain permit authorization through local agencies.
- Create efficient reserve unit management plans that complement existing monitoring and adaptive management efforts of the Permittees and other land management entities in the study area and the region.

1.1.2 Purpose

The purpose of this Plan is to protect and enhance ecological diversity and function in the greater portion of Santa Clara County, while allowing appropriate and compatible growth and development in accordance with applicable laws. To this end, the Plan describes how to avoid, minimize, and mitigate impacts on endangered and threatened species, thereby addressing the permitting requirements relevant to these species for activities conducted in the Plan area by the Permittees. These activities (i.e., *covered activities*) include urban and rural growth and a variety of road, water, and other needed infrastructure construction and maintenance activities. The Plan also describes the responsibilities associated with operating and maintaining the new habitat reserves that will be created to mitigate anticipated impacts resulting from growth and development activities.

This Plan is both a habitat conservation plan (HCP) intended to fulfill the requirements of the ESA and a natural community conservation plan (NCCP) to fulfill the requirements of the California Natural Community Conservation Planning Act (NCCP Act). As an NCCP, this Plan not only addresses impact mitigation, but will also contribute to the recovery and delisting of listed species and help preclude the need to list additional species in the future. The Local Partners are voluntarily preparing this Plan as an NCCP to provide a higher level of conservation for the benefit of natural resources in Santa Clara County than is strictly required for ESA compliance. An NCCP also provides greater regulatory benefits and greater opportunities for state and federal funding than do other permitting options under state law.

In summary, this Plan will achieve the specific objectives listed below.

- Provide comprehensive species, natural community, landscape, and ecosystem conservation in the study area.
- Contribute to the recovery of endangered species in Santa Clara County and northern California.
- Protect and enhance biological and ecological diversity in the county.

- Establish a regional system of habitat reserves to preserve, enhance, restore, manage, and monitor native species and the habitats and ecosystems upon which they depend.
- Enhance and restore stream and riparian systems outside the habitat reserves to provide additional benefit to native fish and other stream-dwelling species.
- Allow issuance of permits to the Permittees for lawful incidental take[1] of species listed as threatened or endangered pursuant to ESA and CESA.
- Provide a means for the local agencies receiving permits to extend the incidental take authorization to private entities subject to their jurisdiction, bringing endangered species permitting under local control.
- Streamline and simplify the process for future incidental take authorization of currently nonlisted species that may become listed during the permit term.
- Standardize avoidance, minimization, mitigation, and compensation requirements of the ESA, CESA, NCCP Act, California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and other applicable laws and regulations relating to biological and natural resources within the planning area, so that public and private actions will be governed equally and consistently, thus reducing delays, expenses, and regulatory duplication.
- Provide a less costly, more efficient project review process that will result in greater conservation than the current project-by-project, species-by-species endangered species compliance process.

Incidental take authorization (referred to as *take authorization* in this document) will be granted by the U.S. Fish and Wildlife Service (USFWS), and California Department of Fish and Game (CDFG) (collectively, the Wildlife Agencies). The Local Partners are asking the Wildlife Agencies to issue permits that authorize incidental take of covered species. The Plan includes a conservation strategy to compensate for impacts on these covered species. The conservation strategy provides for the conservation and management of covered species and their habitats.

It is anticipated that the Plan will allow issuance of incidental take permits under the ESA and the NCCP Act by the Wildlife Agencies to the local jurisdictions. The Permittees will then be able to use those permits for their own operations, maintenance, and capital projects. The Permittees will also be able to extend the take authorization to private entities conducting activities covered by this Plan and under their jurisdiction[2] (see Chapter 2 for a detailed summary of activities eligible for these permits). The Wildlife Agencies will also provide assurances to the Permittees and Plan participants that no further commitments of funds, land,

[1] *Take* as defined by the ESA means “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” *Incidental take* is take that is incidental to, and not intended as part of, an otherwise lawful activity.

[2] Note that the HCP and NCCP permits will only authorize the incidental take of covered species. Most activities will also require additional local authorization (e.g., CEQA), and some activities will also require additional state or federal authorization.

or water will be required to address impacts on covered species beyond that described in the Plan as long as the Permittees are adequately implementing the Plan (see Chapter 10).

The Plan will also be used to comply with Section 7 of the ESA for projects with federal agency involvement. See Section 1.3.1 *Federal and State Endangered Species Laws* for more details.

1.1.3 Background

Local Partner agencies in Santa Clara County have until now primarily conducted threatened and endangered species permitting for urban growth, infrastructure development, and operations and maintenance activities with the Wildlife Agencies on a project-by-project basis[3]. In 2001, a USFWS Section 7 biological opinion (U.S. Fish and Wildlife Service 2001) recommended that a regional HCP for all or most of Santa Clara County be developed as a condition for approval of several development and road construction activities; these are listed below.

- U.S. Highway (U.S.) 101 widening (San José to Morgan Hill).
- Bailey Avenue Extension/U.S. 101 interchange.
- U.S. 85/101 South interchange.
- Coyote Valley Research Park.

An HCP was recommended so that local agencies could offset the cumulative and indirect effects of large-scale development and infrastructure projects on federally listed species. Similar recommendations have been made for other northern California counties (e.g., Contra Costa, Solano, Yolo, Sacramento, Yuba, Sutter, and Placer) for their large-scale water and transportation infrastructure projects.

In response to this recommendation, the County, the City of San José, VTA, and SCVWD entered into discussions that led to the signing of a memorandum of understanding (MOU) in June 2004 (City of San José et al. 2004). This MOU stated the signatories' agreement to develop a joint HCP/NCCP and to share in its funding. The MOU also stated that this HCP/NCCP would be a multi-species, multi-habitat plan that would establish a regional reserve system and would address and satisfy immediate and future regulatory compliance needs of the signatories. The regional reserve system would focus on acquisition, preservation, restoration, monitoring, and management of habitat used by the covered species identified in the Plan. Soon after the MOU was signed, these local agencies entered negotiations with CDFG to develop a Planning Agreement, a requirement of the NCCP Act.

[3] An important exception is the SCVWD's Stream Maintenance Program permits, described in Chapter 2, Section 2.3.4.

Two new Local Partners, the Cities of Gilroy and Morgan Hill, joined the process in 2005.

All six Local Partners, USFWS, and CDFG signed a Planning Agreement on October 20, 2005 (County of Santa Clara et al. 2005). The purpose of this Planning Agreement was to lay the groundwork for development of an HCP/NCCP. Specifically, the Planning Agreement:

- Defined the signatories' goals and obligations with respect to development of the Plan.
- Created a preliminary description of the geographic scope, natural communities and species, and conservation objectives for the Plan.
- Ensured coordination between the Local Partners and Wildlife Agencies.
- Established concurrent planning for wetlands.
- Established a process for inclusion of scientific input and public participation.

The Planning Agreement defines the Plan as satisfying the requirements for an HCP under Section 10 of the ESA and an NCCP under the state NCCP Act.

The role of the Local Partners is to manage and fund development of the Plan for submission to the Wildlife Agencies. Pursuant to Section 10(a)(1)(B) of the ESA, once approved, the Plan and associated permit will authorize incidental take of federally listed species within the study area. The approved Plan will also serve as an NCCP and, once approved by CDFG, will enable CDFG to authorize take of covered species under Section 2835 of the California Fish and Game Code.

The Santa Clara Valley Open Space Authority (Open Space Authority) is expected to be a key partner during Plan implementation (see Chapter 8).

1.2 Scope of the Habitat Plan

This section introduces key elements of the Habitat Plan: covered activities, geographic scope, permit term, and covered species.

1.2.1 Covered Activities

A primary goal of this Plan is to protect species and their habitats in order to obtain authorization for incidental take of covered species under the ESA and the NCCP Act for certain types of activities in specific areas of Santa Clara County, in accordance with approved land use plans. *Covered activities* are those projects or ongoing activities that will receive incidental take authorization by the ESA and NCCP permits. Covered activities in the Plan fall into seven general categories.

- Urban development.
- In-stream capital projects.
- In-stream operations and maintenance.
- Rural capital projects outside streams.
- Rural development.
- Rural operation and maintenance of public infrastructure outside streams.
- Conservation strategy implementation (i.e., activities within the lands managed, enhanced, restored, and monitored to conserve the natural resources targeted by this Plan).

For details on the covered activities and the criteria used to select them, see Chapter 2 *Land Use and Covered Activities*.

1.2.2 Geographic Scope

The Local Partners began the planning process by defining a broad area—the *study area*—in which all planning would occur for the Plan.

Study Area

The study area lies within Santa Clara County (**Figures 1-1 and 1-2**)[4]. Santa Clara County has a land area of 835,449 acres; the study area encompasses 519,506 acres, or approximately 62% of the county. The study area was defined as the area in which all covered activities would occur, impacts would be evaluated, and conservation activities would be implemented. The boundary of the study area was based on political, ecological, and hydrologic factors. The study area includes all of the Llagas/Uvas/Pajaro watersheds within Santa Clara County and all of the Coyote Creek watershed except for the Baylands. A large portion of the Guadalupe watershed is also within the study area. The study area also encompasses small areas outside these watersheds, as described below.

The northern edge of the study area is defined by the boundary of Alameda and Santa Clara Counties, excluding the Milpitas City Limits[5] and lands to the north owned by the San Francisco Public Utilities Commission (SFPUC). The SFPUC is preparing an HCP for lands in their Alameda watershed that includes approximately 10,000 acres in Santa Clara County.

[4] As discussed below, California State Parks (State Parks) lands are excluded from the permit area. Because of this exclusion, all of the land cover-related analyses in the Plan are based on the study area less State Parks lands unless otherwise noted. The size of the study area less State Parks lands is 460,205 acres.
[5] For convenience, all of Ed R. Levin County Park is included in the study area, even though a portion of this park is in Milpitas.

Lands in Joseph D. Grant County Park and Mount Madonna County Park outside the Coyote Creek and Llagas/Uvas/Pajaro watersheds are included in the study area, marking the eastern and southwestern boundaries of the study area, respectively. This inclusion allows full coverage of activities in these County parks under the Plan.

Tulare Hill, the Santa Teresa Hills, and the Calero Reservoir area, all within the Guadalupe River watershed, are included in the study area to ensure inclusion of serpentine soils and all occupied and potential habitat for Bay checkerspot butterfly, one of the primary covered species for this Plan.

Almaden Quicksilver County Park is in the study area to ensure inclusion of additional serpentine habitat, which supports a disproportionately high number of covered species, particularly covered plants.

Lands along Los Gatos Creek upstream through Vasona County Park owned by SCVWD and the County of Santa Clara Parks and Recreation Department (County Parks) (County of Santa Clara, Parks and Recreation Department 2003) are included in the study area to allow additional coverage of activities by these agencies.

Almost the entire City of San José lies within the study area. The Baylands and Alviso within San José are not within the study area to exclude current and historic tidally influenced areas. This line was drawn with reference to December 2005 color aerial photographs, historic maps of tidal areas (San Francisco Estuary Institute 2006), and data from the Baylands Ecosystem Goals Project (Goals Project 1999). Within San José, the northern boundary of the study area is the northern edge of the “bufferlands” of the Water Pollution Control Plant facility on Zanker Road.

San José’s Baylands were excluded from the study area to avoid covering species restricted to salt marshes and other saline habitats, which would significantly complicate the Plan. Other substantial planning efforts are underway in the Baylands of Santa Clara County (e.g., South Bay Salt Ponds Restoration Project); this area was excluded to avoid duplicating those efforts. In addition, no impacts are expected to occur to the unique Baylands species from covered activities.

Expanded Study Area for Burrowing Owl Conservation

During Plan development, it became necessary to include conservation actions immediately outside of the study area in order to adequately mitigate and contribute to the recovery of western burrowing owl, one of the covered species. As described in Chapter 5 and in the species account (**Appendix D**), the population of western burrowing owl is declining in the study area. Conservation opportunities in the study area to increase the local population are very limited. After extensive discussions with the Wildlife Agencies and species experts, it became clear that the only way to increase the local population was to provide conservation outside the study area.

To address this need, an *expanded study area for burrowing owl conservation* (expanded study area) was identified in the northern edge of the county in portions of the cities of San José, Santa Clara, Mountain View, Milpitas, and Sunnyvale; in Fremont in Alameda County; and a small portion of San Mateo County (**Figure 1-2**). The expanded study area for burrowing owl conservation that falls outside of the primary Habitat Plan study area is 48,464 acres.

The allowable covered activities in this expanded study area are limited only to conservation actions for western burrowing owl. Coverage for these activities is provided only for this species. Projects and activities of the other jurisdictions, which are not Permittees, are not covered.

Permit Area

The *permit area* is the area in which the Permittees are requesting take authorization from USFWS and CDFG for activities and projects covered by this Plan. The permit area constitutes those lands within the study area and expanded study area for burrowing owl conservation on which covered activities occur (see Chapter 2 for a description of covered activities). The permit area is the same as the study area except that it excludes Henry W. Coe State Park (**Figure 1-2**). This park was excluded from the permit area because activities within this park are not covered by the Habitat Plan and because it represents such a large portion of the study area. The small portion of Pacheco State Park within the study area is also excluded from the permit area. The permit area is 508,669 acres (519,506 acres in the study area + 48,464 in the expended study area - 58,642 acres of Henry W. Coe State Park within the study area[6] - 659 acres of Pacheco State Park within the study area).

The permit area also includes small, unmapped areas. Land management and monitoring activities may occur outside the mapped study area where a conservation parcel straddles the mapped permit area as long as more than half of each parcel is contained within the permit area. These unmapped areas will not exceed a total of 250 acres[7].

1.2.3 Permit Term

The permit term is the time period in which all covered activities can receive take authorization under the Plan, consistent with the requirements of the Plan. The permit term is also the time in which all conservation actions must be successfully completed to offset the impacts of the covered activities.

[6] The total size of the park is 85,843 acres, of which 27,201 acres occurs outside the study area in Santa Clara and Stanislaus Counties.
[7] Because of their uncertain location and lack of data, the unmapped areas are not included in the total study area or permit area acreage or any calculations of land cover type.

The Local Partners are seeking permits from the Wildlife Agencies with terms of 50 years. Each Permittee will request a permit from each of the two Wildlife Agencies. If approved, each Local Partner would receive a permit from each agency. These permits will be tied to this Plan and to the Implementing Agreement (**Appendix B**). Each permit will be issued to all Permittees collectively. Prior to permit expiration, the Permittees may apply to renew or amend the Plan and its associated permits and authorizations to extend their terms. The permit term of 50 years was selected because it allows for the full and successful implementation of the covered activities (Chapter 2), the conservation strategy (Chapter 5), the monitoring and adaptive management program (Chapter 7), and the funding strategy (Chapter 9). Each of these components is discussed below.

Time to Implement Covered Activities

A summary of major local planning documents and their respective time horizons is provided in **Table 1-1**. These planning documents have durations between 10 and 50 years, reflecting the time it takes to secure funding and permits and construct the projects identified in the plans. The largest source of covered activities is the urban growth of the three participating cities consistent with their general plans[8] (City of San José 2011; City of Gilroy 2002; City of Morgan Hill 2001) and rural oriented growth in unincorporated Santa Clara County. The Morgan Hill and San José general plans have ultimate build out lines[9] that are assumed to be developed with urban uses by the end of the 50-year permit term and not expand in future General Plan updates. The City of San José General Plan assumes eventual urban development in the Almaden Valley Urban Reserve and Coyote Valley Urban Reserve. Specific plans must first be developed and adopted for each area. The City of Gilroy General Plan addresses growth from 2002 through 2020. If a future Gilroy General Plan update expands the City's urban area, impacts of that expansion to covered species will have to be addressed at that time. Growth in the rural areas of the county is much less constrained geographically than in the cities so it is expected to occur, at a fairly even pace throughout the 50-year permit term, based on trends over the past ten years.

The planning horizon for capital projects is even longer than that of urban development within cities. Timelines for SCVWD's capital projects often extend for decades, so this agency requires a permit term that encompasses the planning horizons of as many of these projects as is feasible. Other covered projects (see Chapter 2) may take several decades to receive the funding needed to implement them (Santa Clara Valley Water District 2000, 2002a, 2002b, 2005a, 2005b). Many public infrastructure projects have a lifespan of 50–100 years. Because much of the public infrastructure in the study area was constructed in the 1940s through the 1960s, local engineers expect most of this infrastructure to need

[8] Any development proposed in future General Plan updates that goes beyond that described in Chapter 2 would not be covered by this Plan; see Chapter 10 for Plan amendment procedures.
[9] Urban Limit Line for Morgan Hill and Greenline for San José.

replacement or major repair in the next 50 years (e.g., all County-maintained bridges are expected to need replacement or major repairs in the next 50 years).

Some covered projects are not expected to be implemented until later in the 50-year permit term. Such projects include the many bridge replacement projects, several flood control and water supply projects, and several road widening projects. A longer permit term is necessary to anticipate and adequately mitigate the impacts of these projects on the covered species.

Ongoing maintenance activities of SCVWD, the County, and participating cities are expected to continue in perpetuity; consequently, take authorization for these activities is needed for as long a period as feasible. As described in Chapter 4, these on-going covered activities are expected to affect the covered species throughout the 50-year permit term. For example, road maintenance performed by the County occurs annually. Maintenance on rural roads is expected to affect habitat for many covered species, including California red-legged frog, California tiger salamander, western burrowing owl, Metcalf canyon jewelflower, most beautiful jewelflower, and Mount Hamilton thistle. Many of these species occur on roadcuts or immediately adjacent to roads in drainages. Similarly, ongoing maintenance by SCVWD covered in this Plan (see Chapter 2) is expected to affect covered species for the duration of the permit term. For example, maintenance of canals has the potential to affect California red-legged frog, western pond turtle, and serpentine plants.

Time to Implement, Monitor, and Adjust Conservation Actions

The length of the permit term also provides adequate time for the assembly of a reserve system and development of a management program on reserve lands. Land will only be acquired from willing sellers. Landowners may not be willing to sell at a reasonable price for many years after the permits are issued. A 50-year permit term provides adequate time for willing landowners to become available and for the land agents of the Plan to negotiate a fair price for the land in fee title or conservation easement (see Chapter 5 for a description of the land acquisition requirements of the Plan and Chapter 8 for a description of the land acquisition process). It may take several years to complete a single land acquisition or purchase a conservation easement. Because 100–200 such transactions will be required to assemble the reserve system, adequate time is needed to ensure this can happen before the end of the permit term. A permit term of 50 years also allows the monitoring and adaptive management programs to become well established so that they will continue in perpetuity successfully. As described in Chapter 7, the monitoring and adaptive management program will go through three distinct phases: data inventory, targeted studies, and long-term monitoring. Each phase will take many years to complete successfully[10].

[10] Many regional HCPs and NCCPs approved in southern California over 10 years ago are still developing their monitoring programs, demonstrating that it takes decades to develop and implement a successful monitoring program on such a large scale.

One type of monitoring, called “status and trend monitoring”, will track long-term trajectories of species populations and other physical and biological conditions in the study area. A permit term of 50 years will provide adequate time to collect enough trend data for all of the covered species; if management responses are necessary, the permit term will also allow sufficient time to adjust management. Monitoring the success of restoration actions (described in Chapter 5) is expected to take 5–10 years for each restoration project. Most restoration actions cannot be initiated until land is acquired for the reserve system. A permit term of 50 years is necessary to allow enough time to complete land acquisition with at least 5–10 years remaining on the permit in which to successfully initiate or complete (and possibly remediate if necessary) all restoration actions. The Permittees have committed to acquiring all land for the Plan by Year 45 and initiating all restoration projects by Year 40 (see Chapter 5 for details). Therefore, a 50-year permit term is necessary to complete these actions and to leave sufficient time for monitoring before the permit term ends.

A successful program for management, monitoring, and adaptive management is essential to the success of the reserve system after the permit term. The Permittees will be obligated during the permit term to address changes in circumstances foreseen by the Plan (see Chapter 10) and to remediate the conservation areas affected by these changes. A longer permit term is more likely to encompass a changed circumstance that will require a remedial action.

Time to Secure Adequate Funding

A 50-year permit term allows sufficient time to generate the necessary funding for Plan implementation. As described in Chapter 9, the Plan will be funded by a wide variety of local, state, and federal sources. Some of these sources will not be available for 10–30 years or more. To take advantage of these funding sources, therefore, the permit term must be at least 40 years.

Funding is also needed during the permit term to generate the necessary funds for management and monitoring after the permit expires (e.g., an endowment). In Chapter 9, the Plan describes how this will be accomplished and by when. The permit term must therefore allow sufficient time to accumulate the long-term funding.

Conclusions

Based on the implementation horizon for covered projects, the ongoing regulatory requirement of operation and maintenance activities, the need to acquire lands and develop a successful reserve system, and the need for adequate funding, the Local Partners have determined that a 50-year permit term will best address regulatory and biological considerations. In summary, the 50-year permit term provides sufficient time to accomplish the following critical elements of the Plan.

- Fully implement the current general plans of the cities and the County.

- Fully implement the Permittees' capital projects that are covered by the Plan.
- Implement the Permittees' ongoing activities as long as is feasible.
- Allow sufficient time to assemble the Plan reserve system from willing sellers and partnerships with local agencies and private landowners.
- Secure all necessary funding for Plan implementation during the permit term and secure funds during the permit term to generate funding for the Plan in perpetuity.
- Develop an effective adaptive management program that will be implemented in perpetuity, given the current uncertainties in knowledge about the ecology of covered species and responses to resource management.
- Provide sufficient incentive for the Local Partners to commit the substantial resources necessary to complete the Habitat Plan (i.e., the permit term covers enough projects and activities to make the large up-front investment in the Habitat Plan cost effective).

Take authorization for all covered activities, including covered operations and maintenance activities, will expire at the end of the permit term, unless the permit is renewed or replaced. Near the end of the permit term, the Permittees will determine whether to extend the term of the permit through the formal amendment process described in Chapter 10.

1.2.4 Covered Species

As required by the NCCP Act, this Plan will protect native biological diversity, habitat for native species, natural communities, and local ecosystems. This broad scope will conserve a wide range of natural resources including native species that are common or rare. However, the permits issued by the Wildlife Agencies will name specific species that are either currently listed as threatened or endangered or that may become listed during the permit term.

This Plan addresses 18 listed and nonlisted species (**Table 1-2**): nine wildlife species and nine plant species. These covered species are expected to be named on the ESA and NCCP Act permits. In exchange, the Plan will provide long-term conservation and management of these species. The 18 covered species were identified on the basis of an initial assessment of the effect of covered activities and conservation measures on 148 species that are listed or that could become listed during the permit term in the study area.

The Plan includes conservation measures to protect all 18 covered species, whether or not they are currently listed. Accordingly, any nonlisted species addressed by the Plan's conservation strategy will not require additional conservation within the study area should that species become listed during the permit term. See *Regulatory Setting* below for a discussion of why plants are included as covered species.

During Plan development, coverage for fish species was sought from the National Marine Fisheries Service (NMFS) and CDFG for south central California coast steelhead (*Oncorhynchus mykiss*), central California coast steelhead (*Oncorhynchus mykiss*), and Central Valley fall-run Chinook salmon (*Onchorhynchus tshawytscha*). Coverage was also sought from USFWS and CDFG for Pacific lamprey (*Lampetra tridentata*). To provide this coverage, the Permittees worked closely with these agencies to develop an aquatic conservation strategy for these fish that would meet their regulatory standards. A draft aquatic conservation strategy for the covered fish was included in the second administrative draft Habitat Plan released in June 2009. However, after extensive discussions, it was determined that coverage for fish species should be obtained through a separate process in order to allow the Plan to be completed within the desired timeframe. Thus, south central California coast steelhead, central California coast steelhead, Central Valley fall-run Chinook salmon, and Pacific lamprey are not covered by the Habitat Plan. Coverage for these species in the Guadalupe River and Coyote Creek watersheds will be provided, in part, by the Three Creeks HCP being prepared by SCVWD (see Chapter 2 for a discussion of this HCP). Coverage for these species in the Pajaro River watershed will need to be provided through a separate conservation plan or an amendment to this Habitat Plan (see Chapter 10 for the amendment process). NMFS, USFWS, and CDFG have committed to supporting the Local Partners in the development and eventual permitting of this separate strategy.

Species Evaluation

To determine which species would be covered by the Plan, a comprehensive list of 148 special-status species that occur or may occur in the study area was compiled (**Appendix C**). This list was developed by reviewing the following sources.

- California Natural Diversity Database (CNDDB) (2008).
- California Native Plant Society (CNPS) (2007) *Inventory of Rare and Endangered Vascular Plants of California*.
- CDFG lists of Special Animals and Special Plants (California Department of Fish and Game 2003, 2006, 2007).
- An animal species list obtained from the USFWS website for Santa Clara County (U.S. Fish and Wildlife Service 2006).
- Personal communication with local experts including Wildlife Agency staff; SCVWD biologists; representatives of local environmental groups including CNPS Santa Clara Valley Chapter, Santa Clara Valley Chapter of the Audubon Society, and Streams for Tomorrow; and members of the Habitat Plan Science Advisors.

Definition of Special-Status Species

Special-status species are defined as plants and animals that are legally protected under ESA, CESA, or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such listing.

Special-status plants are species with one or more of the following characteristics.

- Listed or proposed for listing as threatened or endangered under ESA (50 Code of Federal Regulations [CFR] 17.12 [listed plants] and various notices in the Federal Register [FR] [proposed species]).
- Candidates for possible future listing as threatened or endangered under the ESA (70 FR 24870–24934, May 11, 2005).
- Listed or candidates for listing by the State of California as threatened or endangered under CESA (14 California Code of Regulations [CCR] 670.5).
- Listed as rare under the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.).
- Determined to meet the definitions of rare or endangered under CEQA (State CEQA Guidelines, Section 15380).
- Considered by CNPS to be “rare, threatened or endangered in California” (Lists 1B and 2 in California Native Plant Society 2007) or vascular plants, bryophytes, and lichens listed as having special status by CDFG (California Department of Fish and Game 2007).
- Listed by CNPS as plants about which more information is needed to determine their status and plants of limited distribution (Lists 3 and 4 in California Native Plant Society 2007) that may be included on the basis of local significance or recent biological information.

Special-status animals are species with one or more of the following characteristics.

- Listed or proposed for listing as threatened or endangered under the ESA (50 CFR 17.11 [listed animals] and various notices in the FR [proposed species]).
- Candidates for possible future listing as threatened or endangered under the ESA (70 FR 24870–24934, May 11, 2005).
- Determined to meet the definitions of rare or endangered under CEQA (State CEQA Guidelines, Section 15380).
- Listed or candidates for listing by the State of California as threatened or endangered under CESA (14 CCR 670.5).
- Wildlife species of special concern to CDFG (California Department of Fish and Game 2003).

- Fully protected species under the California Fish and Game Code Section 3511(birds), Section 4700 (mammals), Section 5515 (fish), and Section 5050 (reptiles and amphibians).
- Species with no formal special status but thought by experts to be rare or in serious decline and to warrant special status based on recent information.

Covered Species Criteria

For each special-status species with potential to occur in the study area (**Appendix C**), information was gathered on its status, population trends, distribution, threats, conservation, and management efforts. The following criteria were then applied to each species to determine whether it would be covered (i.e., included in the final permits). To be covered, a species had to meet all four of the following criteria.

Range

The species is known to occur or is likely to occur within the Plan study area, based on credible evidence, or the species is not currently known in the study area but is expected to occur in the study area during the permit term (e.g., through range expansion or reintroduction to historic range).

Status

The species meets at least one of the following statutory criteria.

- Listed under the ESA as threatened or endangered, or proposed for listing.
- Listed under CESA as threatened or endangered or a candidate for such listing.
- Listed under the Native Plant Protection Act as rare.
- Expected to be listed under ESA or CESA within the permit term (assumed to be 50 years). Potential for listing during the permit term is based on current listing status, consultation with experts and Wildlife Agency staff, evaluation of species population trends and threats, and best professional judgment of the biologists working on the Plan.

Impact

The species or its habitat would be adversely affected by covered activities or projects that may result in take of the species.

Data

Sufficient data on the species' life history, habitat requirements, and occurrence in the study area are available to adequately evaluate impacts on the species and to develop conservation measures to mitigate these impacts to levels specified by regulatory standards.

Species proposed for coverage in the Plan were limited to those species for which impacts from covered activities were likely. However, it is important to note that many other special-status species and common species are expected to benefit from the conservation strategy of this Plan, as described in Chapter 5.

1.2.5 Relationship to the Proposed Three Creeks Habitat Conservation Plan

SCVWD is developing the Three Creeks Habitat Conservation Plan (Three Creeks HCP) to protect and enhance habitats for a suite of aquatic species and provide conservation for species impacted by SCVWD's on-going water supply operations in the northern Santa Clara Valley.

The geographic area of the proposedThree Creeks HCP includes the following.

- Coyote Watershed in the eastern portion of the County. Sixteen major creeks drain this 322-square-mile area. The county's largest watershed, it extends from the urbanized valley floor upward to the natural areas of the Mt. Hamilton range. Coyote Creek, its main waterway, is the longest creek in the county.
- Guadalupe Watershed in the east-central part of the County. This 170-square-mile area drains to the Guadalupe River and its tributaries through downtown San José. SCVWD has facilities on four major tributaries: Calero Creek, Alamitos Creek, Guadalupe Creek, and Los Gatos Creek. The Guadalupe River Watershed drains both the Mt. Hamilton Range and the Santa Cruz Mountains Range (Los Gatos Creek).
- Stevens Creek Watershed in the southwest portion of the County. This watershed is part of the Lower Peninsula Watershed, a 98-square-mile area whose many small-creek watersheds feed the tidal wetlands along the San Francisco Bay's southwest shoreline. Stevens Creek has one of the last remaining viable steelhead trout runs in the County.

The geographic area of the proposed Three Creeks HCP partially overlaps with the Habitat Plan study area. The Three Creeks HCP includes the Stevens Creek, Guadalupe, and Coyote watersheds but does not include the Pajaro/Uvas/Llagas watersheds. The Plan study area does not include the Stevens Creek watershed and the Los Gatos Creek portion of the Guadalupe watershed. See **Figure 1-3** for a map of the Three Creeks HCP program area in relation to the Habitat Plan study area.

The proposed Three Creeks HCP covers implementation of capital projects and operations and maintenance activities within its study area related to water supply. The Three Creeks HCP is a standalone document; however, the activities described in Chapter 2 of this Plan that occur in the Three Creeks HCP study area (Guadalupe Creek, Alamitos Creek, Calero Creek, the Guadalupe River, Coyote Creek, and Penitencia Creek) are covered activities under both the Three Creeks HCP and the Habitat Plan. Covered activities described in this Plan that occur in the Uvas/Llagas watersheds are only covered by this Plan. Three Creeks HCP activities within Los Gatos Creek will be covered by this Plan at and below Vasona Lake. The Habitat Plan does not include Stevens Creek or Los Gatos Creek above Vasona Lake.

In addition to the water supply activities, the proposed Three Creeks HCP contains a Conservation Program targeted at the conservation of listed fish species. Some of the conservation actions described in the Three Creeks HCP may have adverse affects on semi-aquatic species covered by this Plan, including the California tiger salamander, California red-legged frog, and western pond turtle. Therefore, this Plan covers the activities described in the Three Creeks HCP Conservation Program for potential impacts to species covered by this Plan. The Three Creeks HCP Conservation Plan is described in Chapter 2.

Under the proposed Three Creeks HCP, SCVWD will request incidental take permits from USFWS and CDFG (through a Fish and Game Code Section 2080.1 concurrence finding or a 2081 incidental take permit) for the species and geographic areas unique to the Three Creeks HCP.

1.3 Regulatory Setting

The Plan is designed primarily to comply with the ESA, CESA, and the NCCP Act. The Plan is also consistent with other federal and state wildlife and related laws and regulations, listed here and described in greater detail below.

- Migratory Bird Treaty Act.
- Bald Eagle and Golden Eagle Protection Act.
- California Fish and Game Code Sections 3511, 4700, 5050, 5515 (fully protected species).
- California Fish and Game Code Section 3503 (bird nests).
- California Fish and Game Code Section 3503.5 (birds of prey).
- National Environmental Policy Act of 1969.
- California Environmental Quality Act of 1970.
- Clean Water Act of 1972 Sections 401 and 404.
- Porter-Cologne Water Quality Control Act.
- California Fish and Game Code Sections 1600–1616 (Lake or Streambed Alteration Agreement).
- National Historic Preservation Act.

1.3.1 Federal and State Endangered Species Laws

Federal Endangered Species Act

USFWS and NMFS administer the ESA. ESA requires USFWS and NMFS to maintain lists of threatened and endangered species and affords substantial protection to listed species. NMFS's jurisdiction under ESA is limited to the protection of marine mammals, marine fishes, and anadromous fishes[11]; all other species are subject to USFWS jurisdiction.

USFWS and NMFS can list species as either *endangered* or *threatened*. An *endangered* species is at risk of extinction throughout all or a significant portion of its range (ESA Section 3[6]). A *threatened* species is likely to become endangered within the foreseeable future (ESA Section 3[19]). Section 9 of the ESA prohibits the take of any fish or wildlife species listed under ESA as endangered or threatened[12]. *Take*, as defined by ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." *Harm* is defined as "any act that kills or injures the species, including significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering" (50 CFR 17.3). Section 9 prohibits the "removal or reduction to possession" of any listed plant species "under federal jurisdiction" (i.e., on federal land, where federal funding is provided, or where federal authorization is required). Even though under ESA there is no prohibition for take of plants on nonfederal lands, this Plan includes many covered plants. Some plants are covered in order to meet regulatory obligations under ESA Section 7 and to comply with CESA. Incidental take authorization is also requested for plants to provide no-surprises assurances for these species (see Chapter 10 *Assurances*).

The ESA includes mechanisms that provide exceptions to the Section 9 take prohibitions. These are addressed in Section 7 for federal actions and Section 10 for nonfederal actions.

Section 7

Section 7 of the ESA requires all federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of habitat critical to such species' survival. To ensure that its actions do not result in

[11] *Anadromous fishes* are fish that spend part of their life cycle in the ocean and part in fresh water. NMFS has jurisdiction over anadromous fish that spend the majority of their life cycle in the ocean.
[12] The protection of threatened species under Section 9 is discretionary through a rule issued under Section 4(d) of the ESA. Until a "4(d) rule" is issued by NMFS, threatened anadromous fish or marine species are not protected by the ESA. By regulation, the USFWS automatically affords Section 9 protections to threatened species at the time of listing. These protections can later be modified by USFWS through a 4(d) rule.

jeopardy to listed species or in the adverse modification of critical habitat[13], each federal agency must consult with USFWS or NMFS—or both—regarding federal agency actions that may affect listed species. The issuance of permits for this Plan is a federal action that triggers a Section 7 consultation. Consultation begins when the federal agency submits a written request for initiation to USFWS or NMFS, along with the agency's biological assessment of its proposed action, and when USFWS or NMFS accepts that biological assessment as complete. If USFWS or NMFS concludes that the action is not likely to adversely affect a listed species, the action may be conducted without further review under ESA. Otherwise, USFWS or NMFS must prepare a written biological opinion describing how the agency's action will affect the listed species and its critical habitat. For this Plan, the USFWS will consult internally (with itself) to comply with Section 7 of the ESA.

If the biological opinion concludes that the proposed action would jeopardize the continued existence of a listed species or adversely modify its critical habitat, the opinion will suggest "reasonable and prudent alternatives" that would avoid that result. If the biological opinion concludes that the proposed action would take a listed species but would not jeopardize its continued existence, the biological opinion will include an *incidental take statement*. *Incidental take* is take that is "incidental to, and not intended as part of, an otherwise lawful activity" (64 CFR 60728). The incidental take statement specifies an amount of take that is allowed to occur as a result of the action and may require reasonable and prudent measures to minimize the impact of the take.

Any project with a federal lead agency or federal involvement (e.g., a federal permit, federal funding, or a project on federal land) must obtain their take authorization through Section 7 rather than Section 10 and an HCP. This means that projects with federal involvement cannot directly utilize an approved HCP for their take authorization. However, if the applicant complies with the conservation measures in this Plan, the Section 7 consultation process is expected to be greatly streamlined. Therefore, the covered activities described in Chapter 2 include projects or activities that may need to obtain their take authorization through Section 7. Unless otherwise required by law or regulation, USFWS will ensure that a biological opinion for a project with a federal lead agency that is addressed by the Plan is consistent with the biological opinion for the Habitat Plan. USFWS will not impose measures on applicants for coverage under the Plan in excess of those that have been or will be required by the Implementing Agreement[14], the Plan, and the permits, unless otherwise required by law or regulation. Federal agencies cannot receive the regulatory assurances available under Section 10 of the ESA.

[13] *Critical habitat* is defined as specific geographic areas, whether occupied by listed species or not, that are determined to be essential for the conservation and management of listed species, and that have been formally described in the Federal Register.

[14] The Implementing Agreement is a legal document, signed by all parties, that identifies roles and responsibilities of all parties, including the Permittees and the Wildlife Agencies. The agreement typically incorporates actions from the conservation plan that are agreed to by all parties. See Appendix B for the Implementing Agreement for this Plan.

Section 10

Until 1982, state, local, and private entities had no means to acquire incidental take authorization as could federal agencies under Section 7. Private landowners and local and state agencies risked direct violation of the ESA no matter how carefully their projects were implemented. This statutory dilemma led Congress to amend Section 10 of the ESA in 1982 to authorize the issuance of an incidental take permit to nonfederal project proponents upon completion of an approved conservation plan. The term *conservation plan* has evolved into *habitat conservation plan*.

In cases where federal land, funding, or authorization is not required for an action by a nonfederal entity, the take of listed fish and wildlife species can be permitted by USFWS and/or NMFS through the Section 10 process. Private landowners, corporations, state agencies, local agencies, and other nonfederal entities must obtain a Section 10(a)(1)(B) *incidental take permit* for take of federally listed fish and wildlife species "that is incidental to, but not the purpose of, otherwise lawful activities."

The take prohibition for listed plants is more limited than for listed fish and wildlife. Under Section 9(a)(2)(B) of the ESA, endangered plants are protected from "removal, reduction to possession, and malicious damage or destruction" in areas that are under federal jurisdiction. Section 9(a)(2)(B) of the ESA also provides protection to plants from removal, cutting, digging up, damage, or destruction where the action takes place in violation of any state law or regulation or in violation of a state criminal trespass law. Thus, the ESA does not prohibit the incidental take of federally listed plants on private or other nonfederal lands unless the action requires federal authorization or is in violation of state law. Thus, Section 10 incidental take permits are only required for wildlife and fish species. However, the Section 7(a)(2) prohibition against jeopardy applies to plants, and issuance of a Section 10(a)(1)(B) incidental take permit cannot result in jeopardy to a listed plant species.

The HCP must specify the following mandatory elements.

- The impact that will likely result from the taking of covered species.
- The steps the applicant will take to monitor, minimize, and mitigate such impacts to the maximum extent practicable.
- The funding that will be available to implement such steps.
- The procedures to be used to deal with unforeseen circumstances[15].
- The alternative actions to such taking the applicant considered and the reasons why such alternatives are not proposed to be utilized.

[15] *Unforeseen circumstances* are changes in circumstances affecting a covered species or geographic area covered by the HCP that could not reasonably have been anticipated by the plan developers, and that result in a substantial and adverse change in the status of a covered species.

- Such other measures that the Director [of the Department of Interior or Commerce] may require as being necessary or appropriate for purposes of the plan (50 CFR 17.22(b)).

The Santa Clara Valley Habitat Plan is intended to satisfy these requirements.

To receive an incidental take permit, Section 10(a)(2)(B) of the ESA requires that the following criteria be met.

- The taking will be incidental to otherwise lawful activities.
- The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking.
- The applicant will ensure adequate funding for the HCP and procedures to deal with unforeseen circumstances.
- The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild.
- The applicant will ensure that other measures that the Services [USFWS and NMFS] may require as being necessary or appropriate will be provided.
- The Services have received such other assurances as may be required that the HCP will be implemented.

Prior to the approval of an HCP, USFWS is required to undertake an internal Section 7 consultation[16] because issuance of an incidental take permit is a federal action. (See the discussion of ESA Section 7, above.) Elements specific to the Section 7 process that are not required under the Section 10 process (e.g., analysis of impacts on designated critical habitat, analysis of impacts on listed plant species, and analysis of indirect and cumulative impacts on listed species) are included in this Plan to meet the requirements of Section 7.

California Endangered Species Act

CESA prohibits take of wildlife and plants listed as threatened or endangered by the California Fish and Game Commission. *Take* is defined under the California Fish and Game Code (more narrowly than under ESA) as any action or attempt to "hunt, pursue, catch, capture, or kill." Therefore, take under CESA does not include "the taking of habitat alone or the impacts of the taking"[17]. Rather, the courts have affirmed that under CESA, "taking involves mortality."

Like ESA, CESA allows exceptions to the prohibition for take that occurs during otherwise lawful activities. The requirements of an application for incidental take under CESA are described in Section 2081 of the California Fish and Game Code. Incidental take of state-listed species may be authorized if an applicant submits an approved plan that minimizes and "fully mitigates" the impacts of this take.

[16] When USFWS issues a permit, they will consult with itself and NMFS, if necessary.
[17] *Environmental Council of Sacramento v. City of Sacramento*, 142 Cal. App. 4th 1018 (2006).

Natural Community Conservation Planning Act

In 1991, California's NCCP Act (California Fish and Game Code, Section 2800 et seq.) was enacted to implement broad-based planning that balances appropriate development and growth with conservation of wildlife and habitat. Pursuant to the NCCP Act, local, state, and federal agencies are encouraged to prepare NCCPs to provide comprehensive management and conservation of multiple species and their habitats under a single plan, rather than through preparation of numerous individual plans on a project-by-project basis. The NCCP Act is broader in its orientation and objectives than are ESA and CESA, and preparation of an NCCP is voluntary. The primary objective of the NCCP program is to conserve natural communities at the ecosystem scale while accommodating compatible land use. To be approved by CDFG, an NCCP must provide for the conservation of species and protection and management of natural communities in perpetuity within the area covered by permits. *Conservation* is defined by the NCCP Act and the California Fish and Game Code as actions that result in the delisting of state-listed species. Thus, NCCPs must contribute to the recovery of listed species or prevent the listing of nonlisted species rather than just mitigate the effects of covered activities. This recovery standard is one of the major differences between an NCCP and an HCP prepared to satisfy ESA or CESA.

The 1991 NCCP Act was replaced with a substantially revised and expanded NCCP Act in 2002. The revised NCCP Act established new standards and guidance on many facets of the program, including scientific information, public participation, biological goals, interim project review, and approval criteria. The new NCCP Act took effect on January 1, 2003. To approve an NCCP under the new NCCP Act, CDFG must make a series of findings.

- The Plan must be consistent with the Planning Agreement.
- The Plan must provide for the conservation and management of the covered species (*conservation* is defined to mean that the Plan must contribute to species recovery).
- The Plan must protect habitat, natural communities, and species diversity on the landscape level (definitions of these and other NCCP terms are provided in Chapter 3 and **Appendix A**).
- The Plan must conserve the ecological integrity of large habitat blocks, ecosystem function, and biodiversity.
- The Plan must support sustainable populations of covered species.
- The Plan must provide a range of environmental gradients and habitat diversity to support shifting species distributions.
- The Plan must sustain movement of species among reserves.
- Mitigation and conservation must be roughly proportional to impacts in timing and extent.
- Funding for conservation, monitoring, and adaptive management must be adequately assured.

The Santa Clara Valley Habitat Plan is intended to comply with the NCCP Act to conserve the covered species and ecosystems of a significant part of Santa Clara County and to provide authorization for take of covered species in accordance with Section 2835 of the California Fish and Game Code. **Table 1-3** provides a "checklist" of NCCP findings that CDFG must make to issue its NCCP permit along with the locations in the document where those findings are supported.

1.3.2 Other Federal and State Wildlife Laws and Regulations

Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918, as amended (MBTA), implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds is unlawful, as is taking of any parts, nests, or eggs of such birds (16 U.S. Government Code [USC] 703). *Take* is defined more narrowly under the MBTA than under ESA and includes only the death or injury of individuals of a migratory bird species or their eggs. As such, *take* under the MBTA does not include the concepts of harm and harassment as defined under ESA. The MBTA defines migratory birds broadly; all covered birds in this Plan are considered migratory birds under the MBTA.

USFWS provides guidance regarding take of federally listed migratory birds (Appendix 5 in the HCP Handbook [U.S. Fish and Wildlife Service and National Marine Fisheries Service 1996]). According to these guidelines, an incidental take permit can function as a Special Purpose Permit under the MBTA (50 CFR 21.27) for the take of all ESA-listed covered species in the amount and/or number and subject to the terms and conditions specified in an HCP. Any such take will not be in violation of the MBTA (16 USC 703-12). The following covered species are protected by the MBTA.

- Western burrowing owl.
- Least Bell's vireo.
- Tricolored blackbird.

Of these, only least Bell's vireo is currently listed under ESA. Accordingly, once issued, the incidental take permit will automatically function as a Special Purpose Permit under the MBTA, as specified under 50 CFR Sec. 21.27, for least Bell's vireo for a 3-year term subject to renewal by the Permittees. Should any other of the covered birds become listed under ESA during the permit term, the ESA permit would also constitute a Special Purpose Permit under the MBTA for that species for a 3-year term as specified under 50 CFR 21.27 subject to renewal by the Permittees.

Nonlisted covered species as well as other migratory birds not covered by the permit will benefit from seasonal restrictions on construction and other conservation measures described in this Plan. The creation of the Reserve System and subsequent restoration and management will also be a significant "benefit to the migratory bird resource" as required by the Special Purpose Permit. Compliance with the conditions on covered activities described in Chapter 6 are consistent with the requirements of the MBTA for the covered migratory birds. It will be the responsibility of individual project applicants to fully comply with the MBTA for non-covered migratory birds.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (Eagle Act) prohibits the taking or possession of and commerce in bald and golden eagles with limited exceptions. Under the Eagle Act, it is a violation to "take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or in any manner, any bald eagle commonly known as the American eagle, or golden eagle, alive or dead, or any part, nest, or egg, thereof." *Take* is defined to include pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, and disturb. *Disturb* is further defined in 50 CFR Part 22.3 as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

Recent revisions to the Eagle Act authorizes take of bald eagles and golden eagles under the following conditions: (1) where the take is compatible with the preservation of the bald eagle and golden eagle, (2) is necessary to protect an interest in a particular locality, (3) is associated with but not the purpose of an otherwise lawful activity, and (4) for individual instances of take the take cannot be avoided, or (5) for programmatic take the take is unavoidable even though advanced conservation practices are being implemented (50 CFR 22.26). Permits issued under this regulation usually authorize disturbance only; however, in limited cases a permit may authorize lethal take that results from but is not the purpose of an otherwise lawful activity.

Bald and golden eagles are not covered species in this Plan.

California Fully Protected Species

In the 1960s, before CESA was enacted, the California legislature identified specific species for protection under the California Fish and Game Code. These *fully protected* species may not be taken or possessed at any time, and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of bird species for the protection of livestock. Fully protected species are described in Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the California Fish and Game Code. These protections state that "…no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected [bird], [mammal], [reptile or amphibian], [fish].” This Plan includes conservation measures to avoid taking fully protected species as defined by the California Fish and Game Code[18]. Fully protected species expected to occur in the study area include, but are not restricted to, those listed below.

- Golden eagle.
- American peregrine falcon.
- Southern bald eagle.
- White-tailed kite.
- California condor.
- Ring-tailed cat (= ringtail).

California Fish and Game Code 3503 (Bird Nests)

Section 3503 of the California Fish and Game Code makes it “unlawful to take, possess, or needlessly destroy the nests or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.” Therefore, CDFG may issue permits authorizing take. The Plan contains conservation measures to avoid and minimize such take to the maximum extent practicable in order to comply with Section 3503. However, some take to covered birds may still occur; the NCCP permit will serve as the authorization for take nests or eggs of covered birds pursuant to Section 3503.

California Fish and Game Code 3503.5 (Birds of Prey)

Section 3503.5 of the California Fish and Game Code prohibits the take, possession, or destruction of any birds of prey or their nests or eggs “except as otherwise provided by this code or any regulation adopted pursuant thereto.” CDFG may issue permits authorizing take of birds of prey or their nests or eggs pursuant to CESA or the NCCP Act. The only bird of prey covered by the Plan is the western burrowing owl (**Table 1-2**). The Plan contains conservation measures to avoid and minimize take of western burrowing owl in order to comply with Section 3503.5. The NCCP permit will serve as the authorization for take of birds, eggs, or nests of western burrowing owl that cannot be avoided pursuant to Section 3503.5.

[18] Recent legislation allows NCCPs to provide take authorization for fully protected species covered by an NCCP. Because no fully protected species is covered by this Plan, take of fully protected species must be avoided.

1.3.3 National Environmental Policy Act

NEPA requires federal agencies to include in their decision-making process appropriate and careful consideration of all environmental effects of a proposed action and of possible alternatives. Documentation of the environmental impact analysis and efforts to avoid or minimize the adverse effects of proposed actions must be made available for public notice and review. This analysis is documented in either an environmental assessment or an environmental impact statement (EIS). Project proponents must disclose in these documents whether their proposed action will adversely affect the human or natural environment. NEPA's requirements are primarily procedural rather than substantive in that NEPA requires disclosure of environmental effects and mitigation possibilities but includes no requirement to mitigate.

The issuance by USFWS of an incidental take permit under Section 10 of the ESA constitutes a federal action. Therefore, USFWS must comply with NEPA. To satisfy NEPA requirements, USFWS released a draft EIS in mid-December of 2010 for a 90-day comment period that closed in March 2011. The draft EIS accompanied the draft Habitat Plan.

1.3.4 California Environmental Quality Act

CEQA is similar to but more extensive than NEPA in that it requires that significant environmental impacts of proposed projects be reduced to a less-than-significant level through adoption of feasible avoidance, minimization, or mitigation measures unless overriding considerations are identified and documented that make the mitigation measures or alternatives infeasible. CEQA applies to certain activities in California undertaken by either a public agency or a private entity that must receive some discretionary approval from a California government agency. In issuing the NCCP Act permit, CDFG must comply with CEQA. Similarly, the action of the Local Partners in adopting the Plan is subject to CEQA compliance. The County of Santa Clara is serving as the lead agency under CEQA. To comply with CEQA, the Local Partners released a draft joint environmental impact statement/ environmental impact report (EIS/EIR) in mid-December of 2010. The public comment period on the draft EIS/EIR closed in March 2011. The draft EIS/EIR accompanied the draft Habitat Plan.

The final EIS/EIR prepared for the Habitat Plan is intended to provide programmatic compliance with CEQA for all activities covered by this Plan. Future projects that receive take coverage under the Plan must also comply with CEQA at the project level through their local jurisdiction. It is expected that the conservation provided in this Plan will be sufficient to meet all CEQA mitigation standards for impacts on the special-status species and natural communities that are covered in this Plan. However, because circumstances may change, full CEQA coverage through the EIS/EIR prepared for the Habitat Plan cannot be guaranteed. Barring major changes, it is expected that future CEQA documents for activities that receive take coverage under this Plan will incorporate the conservation measures in this Plan by reference to comply with CEQA for the covered species and natural communities addressed in this Plan. The Plan implements a conservation strategy designed to achieve a comprehensive set of biological goals and objectives. Furthermore, as an NCCP, the Plan provides for broad-based planning to preserve natural communities at the ecosystem scale.

Many of the conservation measures in the Plan will also benefit other special-status species (i.e., species not covered by the Plan); such measures may be sufficient to meet CEQA standards for these other species as well.

1.3.5 Federal and State Wetland Laws and Regulations

Clean Water Act Section 404

The Clean Water Act is the primary federal law that protects the physical, chemical, and biological integrity of the nation's waters, including lakes, rivers, wetlands, and coastal waters. Programs conducted under the Clean Water Act are directed at both point source pollution (e.g., waste discharged from outfalls and filling of waters) and nonpoint source pollution (e.g., runoff from parking lots). Under the Clean Water Act, the U.S. Environmental Protection Agency (EPA) and state agencies set effluent limitations and issue permits under Clean Water Act Section 402 governing point-source discharges of wastes to waters. The U.S. Army Corps of Engineers (Corps), applying its regulations under guidelines issued by EPA, issues permits under Clean Water Act Section 404 governing under what circumstances dredged or fill material may be discharged to waters. These Section 402 and 404 permits are the primary regulatory tools of the Clean Water Act. EPA has oversight over all Clean Water Act permits issued by the Corps.

The Corps issues two types of permits under Section 404: general permits (either nationwide permits or regional permits) and standard permits (either letters of permission or individual permits). General permits are issued by the Corps to streamline the Section 404 process for nationwide, statewide, or regional activities that have minimal direct or cumulative environmental impacts on the aquatic environment. Standard permits are issued for activities that do not qualify for a general permit (i.e., that may have more than a minimal adverse environmental impact).

In early 2012, the Local Partners began pursuing a Regional General Permit (RGP) for the Habitat Plan from the San Francisco District of the Corps for activities covered by the Habitat Plan that also dredge or fill wetlands and other waters of the U.S. The purpose of the RGP would be to provide a simplified and streamlined means for the Corps to authorize activities in waters of the U.S., including wetlands and other waters within the Plan's permit area. The Local Partners anticipate that the RGP would be consistent with the current Nationwide permit program, seeking programmatic coverage for impacts to waters of the U.S. equal to or less than 0.5 acre and 300 linear feet. In certain instances, the

RGP may allow for a slightly increased level of impact to waters of the U.S. Once adopted, the RGP would need to be renewed every 5 years.

Implementation of the proposed RGP is expected to substantially streamline Section 404. Issuance of a Section 404 permit often requires the Corps to consult with USFWS to comply with Section 7 of the ESA. This consultation would address the federally listed species covered by the Plan. Accordingly, it is expected that USFWS will not require any mitigation beyond that already required by the Plan. The Section 7 biological opinions issued for this Plan can also serve as the basis for any future biological opinions in the study area for covered activities. In addition, the conservation actions for impacts to wetlands in this Plan may fully satisfy Corps requirements for wetland mitigation.

Clean Water Act Section 401 and the Porter-Cologne Water Quality Control Act

Under Clean Water Act Section 401, states have the authority to certify federal permits for discharges to waters under state jurisdiction. States may review proposed federal permits (e.g., Section 404 permits) for compliance with state water quality standards. The permit cannot be issued if the state denies certification. In California, the State Water Resources Control Board (State Board) and the Regional Water Quality Control Boards (usually referred to as the Regional Boards) are responsible for the issuance of Section 401 certifications.

The Porter-Cologne Water Quality Control Act is the primary state law concerning water quality. It authorizes the State Board and Regional Boards to prepare management plans such as regional water quality plans (RMC Water and Environment, Jones & Stokes 2006) to address the quality of groundwater and surface water. The Porter-Cologne Water Quality Control Act also authorizes the Regional Boards to issue waste discharge requirements defining limitations on allowable discharge to waters of the state. In addition to issuing Section 401 certifications on Section 404 applications to fill waters, the Regional Boards may also issue waste discharge requirements for such activities. Because the authority for waste discharge requirements is derived from the Porter-Cologne Water Quality Control Act and not the Clean Water Act, waste discharge requirements may apply to a somewhat different range of aquatic resources than do Section 404 permits and Section 401 Water Quality certifications. Applicants that obtain a permit from the Corps under Section 404 must also obtain certification of that permit by the Regional Board with jurisdiction over the project site. In the permit area, the San Francisco Regional Board has jurisdiction over the San Francisco Bay watershed, and the Central Coast Regional Board has jurisdiction over the Monterey Bay watershed. The Plan does not include certifications under Section 401 or waste discharge requirements under the Porter-Cologne Water Quality Control Act. These authorizations, if required, must be obtained separately. The Local Partners intend to work with the local Regional Boards to develop a coordinated process for obtaining required permits.

Lake or Streambed Alteration Agreement

CDFG has jurisdictional authority over streams, lakes, and wetland resources associated with these aquatic systems under California Fish and Game Code Section 1600 et seq. California Fish and Game Code Section 1600 et seq. was repealed and replaced in October 2003 with new Sections 1600–1616 that took effect on January 1, 2004. CDFG has the authority to regulate work that will “substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.” Activities of any person, state, or local governmental agency, or public utility are regulated by CDFG under Section 1602 of the Code. CDFG enters into a streambed or lakebed alteration agreement with the project proponent and can impose conditions on the agreement to ensure no net loss of values or acreage of the stream, lake, associated wetlands, and associated riparian habitat.

The lake or streambed alteration agreement is not a permit, but rather a mutual agreement between CDFG and the project proponent. Because CDFG includes under its jurisdiction streamside habitats that may not qualify as wetlands under the Clean Water Act definition, CDFG jurisdiction may be broader than Corps jurisdiction.

A project proponent must submit a notification of streambed alteration to CDFG before construction. The notification requires an application fee for streambed alteration agreements, with a specific fee schedule to be determined by CDFG. Many of the concerns raised by CDFG during streambed alteration agreement negotiations are related to special-status species. Activities covered by this Plan that need a streambed alteration agreement are expected to fully meet the standards of the streambed alteration agreement through compliance with this Plan for species covered by the Plan.

1.3.6 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470 et seq.), requires Federal agencies to take into account the effects of their actions proposed on properties eligible for inclusion in the National Register of Historic Places. "Properties" are defined as "cultural resources", which includes prehistoric and historic sites, buildings, and structures that are listed on or eligible to the National Register of Historic Places. An undertaking is defined as a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; those requiring a Federal permit, license or approval; and those subject to state or local regulation administered pursuant to a delegation or approval by a Federal agency. The issuance of an incidental take permit is an undertaking subject to Section 106 of the NHPA. The USFWS has determined that the area of potential effects for the present undertaking is that area where on-the-ground project activities will result in take of species. The NHPA and the potential effects of the conservation strategy on resources subject to the NHPA are discussed in detail in the EIR/EIS.

1.4 Overview of HCP/NCCP Planning Process

1.4.1 Organization of the Planning Process

The Habitat Plan was a coordinated effort by six local agencies (i.e., the Permittees).

- 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.

Although not a Permittee, the Santa Clara County Open Space Authority was also involved in preparing the Plan. Coordination and management of the Plan involved the legislative governing bodies of the six Local Partners, a *Liaison Group* consisting of designated elected officials from each of the Local Partners, a *Management Team* of senior staff managers from each of the Permittees, and a *Stakeholder Group*. A Habitat Plan Program Manager reported to the Management Team and was responsible for day-to-day administration of the planning effort. Each group is described below.

The legislative governing bodies of each Local Partner were responsible for making significant decisions, such as approval or amendment of the Planning Agreement with CDFG and USFWS, approval of project financing, approval of the EIS/EIR, and approval of the draft and final Habitat Plan.

1.4.2 Liaison Group

Elected officials from each Local Partner's legislative body met regularly (i.e., at least every other month) as part of the Liaison Group to review and provide guidance on issues to be acted on by the Elected Bodies as well as issues of concern to the Management Team.

1.4.3 Stakeholder Group

In October 2005, the Management Team, after consultations with the Liaison Group, established a Stakeholder Group. The Stakeholder Group's approximately 25 members represented a wide variety of interests, including conservation organizations, business and development interests, landowners, agricultural interests, open space land-management organizations, and the general public. The Stakeholder Group, which met monthly, reviewed technical and policy issues and made recommendations to staff and elected officials. Meetings were attended by staff from the Local Partners and the Wildlife Agencies, the Program Manager, and, as needed, consultants. The Stakeholder Group, which was facilitated by a consultant, strove to achieve consensus. When consensus was not possible, all views were reported to the Management Team and, when applicable, to the Liaison Group and the Elected Bodies.

1.4.4 Science Advisors

Under its Five-Point Policy, USFWS "encourage[s] the use of scientific advisory committees during development and implementation of an HCP" (65 FR 106 35256, June 1, 2000). Independent scientific input is required by the NCCP Act [Section 2810(b)(5)]. The CDFG provides guidelines for "obtaining independent scientific analysis and input, to assist … plan participants in meeting scientifically sound principles for the conservation and management of species" for assembling a science advisory group, defining their scope of work, involving a facilitator, and providing scientific advice (California Department of Fish and Game 2002). The science advisory process for the Santa Clara Valley Habitat Plan was guided by CDFG's guidelines.

The Local Partners felt that independent scientific input early in the planning process was critical to the success of the Plan. Names of potential advisors were suggested by Local Partners, Wildlife Agencies, and a consultant hired specifically to help develop and run the selection process, plan and implement the Science Advisors workshop, and coordinate preparation of the Science Advisors final report. None of the scientists was affiliated with the Santa Clara Valley Habitat Plan or the Local Partners. Qualifications of candidates included academic record, publications, and practical experience in the study area or with the covered species. Scientists were selected based on their qualifications within the areas of expertise listed below:

- conservation planning, reserve design, and wildlife corridors;
- vegetation ecology (with an emphasis on grassland ecology and rangeland management);
- ecological modeling;
- aquatic ecology/fisheries (with knowledge of salmonids[19]);

[19] The science advisory process occurred while fish were being considered for coverage by the Local Partners and the Wildlife Agencies, including NMFS.

- hydrology, watershed planning, and fluvial geomorphology;
- plant conservation biology (with experience in local serpentine plants, oak woodlands, or riparian sycamore systems);
- herpetology (with emphasis on locally rare amphibians and reptiles);
- ornithology (with an emphasis on local bird species); and
- invertebrate ecology (with emphasis on metapopulation theory; rare species conservation and recovery).

Science Advisors were also selected based on their availability to actively participate in the process. A two-day workshop was held July 6 and 7, 2006. A portion of this workshop was open to the public. Other components included a group field trip and a closed-door session at which time the advisors could talk amongst themselves without the Local Partners or their consultants present. Topics considered by the advisors included the following:

- evaluation of data adequacy for inclusion in the Plan,
- identification of data gaps and sources of uncertainty,
- formulation of biological goals and objectives to conserve covered species and natural communities,
- identification of preserve-design principles and scientifically sound conservation measures for the local area, and
- development of monitoring and adaptive management guidelines for covered species and habitats.

The Science Advisors produced a report documenting their findings that was made available to the public in December 2006. The Local Partners considered all comments from the Science Advisors' final report when developing the Plan. Some Science Advisors were also consulted at various times during Plan development for their advice or review.

A separate group of science advisors was convened on October 1, 2010 to review the working draft of the western burrowing owl conservation strategy. These science advisors were selected based on their expertise with the species locally in the study area and in southern San Francisco Bay.

1.4.5 Management Team

The Management Team, which had primary responsibility for developing the Plan, was made up of senior managers from each Local Partner. The Management Team, Plan Program Manager, and key representatives of the consultants generally met monthly. Responsibilities included making decisions that were outside the responsibility of the Elected Bodies and providing direction to local staff working on the Plan, consultants, and the Plan Program Manager. The Management Team and Program Manager actively and regularly coordinated with representatives of the three Wildlife Agencies in development of the Plan.

1.4.6 Local Agency and Wildlife Agency Technical Coordination

Representatives of the Local Partners, consultants, and the Wildlife Agencies held monthly meetings to address project coordination and technical issues.

1.4.7 Consultant Team

This Plan was prepared by a consultant team under the guidance and direction of the Management Team and the Liaison Group. The Consulting Team consisted of scientific, planning, legal, and other technical staff from ICF International (formerly Jones & Stokes) in San José, Oakland, San Francisco, and Sacramento; Moore Iacofano Goltsman (MIG) in Berkeley; Kleinschmidt Associates in Grass Valley; Land Use Planning Services in Palo Alto; Willdan (formerly MuniFinancial) and Hausrath Associates in Oakland; Albion Environmental in Santa Cruz; Dr. Jerry Smith (San José State University); Resources Law Group in Sacramento; and CH2M Hill in Sacramento.

The members of the Consulting Team had the following responsibilities.

- Land Use Planning Services: Program Management.
- ICF International: development of the Plan and public outreach.
- MIG: stakeholder facilitation.
- Kleinschmidt Associates: Science Advisors selection and facilitation.
- Willdan (MuniFinancial) and Hausrath Economics Group: cost and funding analysis (with assistance from ICF International).
- Albion Environmental: western burrowing owl analysis.
- Dr. Jerry Smith: aquatic analysis.
- Lawrence Ford, Ph.D., LD Ford Rangeland Conservation Science: rangeland conservation.
- CH2M Hill: EIS/EIR preparation.
- Resources Law Group: Implementing Agreement drafting and other legal documents.

1.4.8 Public Outreach and Involvement

Public involvement has been an integral part of the process of developing this Plan. Stakeholders and the public have been actively involved throughout the planning process and have had the following opportunities to provide their input and influence the development of the Plan:

- at least quarterly public meetings of the Liaison Group,

- approximately monthly public meetings of the Stakeholder Group,
- a public workshop of the Habitat Plan Science Advisors,
- community public meetings hosted by the Local Partners at key project milestones (approximately one per year),
- public scoping and public-involvement meetings associated with the CEQA/NEPA process,
- periodic presentations to official governing bodies of participating agencies (e.g., boards, councils, planning commissions),
- many presentations to interested organizations upon request, and
- approximately annual training sessions and tours.

In addition, a website announcing all public meetings, posting all public documents, and accepting comments and feedback was used to engage and inform the public.

The Local Partners developed this Plan in compliance with public involvement guidelines established by USFWS and NMFS (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1996) and the requirements of the NCCP Act.

1.5 Document Organization

This Plan and supporting information are presented in the chapters and appendices listed below. Volumes 1, 2, and 3 contain the Habitat Plan, and Volume 4 contains all appendices.

Volume 1

- Chapter 1, *Introduction*, discusses the background, purpose, and objectives of the Plan; reviews the regulatory setting; and summarizes the Habitat Plan process.
- Chapter 2, *Land Use and Covered Activities*, describes the land uses of the study area and the activities covered under the Plan.
- Chapter 3, *Physical and Biological Resources*, describes the existing conditions of the study area relevant to the Plan.

Volume 2

- Chapter 4, *Impact Assessment and Level of Take*, presents the impacts of the covered activities.
- Chapter 5, *Conservation Strategy*, summarizes the conservation strategy and describes the specific conservation actions to be implemented to mitigate the

impacts of the covered activities and contribute to the recovery of the covered species.

- Chapter 6, *Conditions on Covered Activities and Application Process*, describes the specific surveys and other actions required of all covered activities to avoid and minimize impacts to covered species consistent with federal and state regulations.

Volume 3

- Chapter 7, *Monitoring and Adaptive Management Program*, discusses the monitoring requirements and adaptive management procedures associated with implementation of conservation actions and reserve management.
- Chapter 8, *Plan Implementation*, details the administrative requirements associated with Plan implementation and the roles and responsibilities of the Permittees and Wildlife Agencies.
- Chapter 9, *Costs and Funding*, reviews the costs associated with Plan implementation and the funding sources proposed to pay for those costs.
- Chapter 10, *Assurances*, describes the protections for Permittees and neighboring landowners in the event of changed circumstances or unforeseen circumstances, as well as the procedures for modifying or amending the Plan.
- Chapter 11, *Alternatives to Take*, presents the required analysis of alternatives to take of covered species.
- Chapter 12, *List of Preparers*, identifies the individuals involved in the preparation of this document.
- Chapter 13, *Literature Cited*, is a comprehensive bibliography of references cited in the text.

Volume 4

- Appendix A, *Glossary*, is a list of terms and their definitions used in this document.
- Appendix B, *Implementing Agreement*, is a copy of the Implementing Agreement that will be entered into by the Permittees and the Wildlife Agencies. This appendix includes three attachments including a covered species list, the *Implementing Ordinance Template*, and the *Neighboring Landowner Certificate of Inclusion*.
- Appendix C, *Evaluation of Special-Status Species for Coverage in the Habitat Plan*, lists the special-status species that were considered for coverage under this Plan, their legal status, their coverage under the Plan (covered or not covered status), and the rationale for coverage.
- Appendix D, *Species Accounts*, presents detailed ecological accounts of all covered species, including models of habitat distribution (i.e., habitat models) that were developed for selected species.

- Appendix E, *Nitrogen Deposition Contribution Estimates*, provides a technical report on the effects of covered activities on airborne nitrogen and its deposition on serpentine grasslands and other habitats in the study area.
- Appendix F, *Climate Change Analysis*, provides technical details supporting the discussion of the potential effects of climate change on the Reserve System and covered species.
- Appendix G, *Cost Model*, describes the cost model used to estimate Plan costs described in Chapter 9.
- Appendix H, *Conservation Easement Template*, is the template that will be used for conservation easements that protect Reserve System lands.
- Appendix I. Not used.
- Appendix J, *Monitoring at Different Levels*, describes the three levels at which monitoring is conducted. This technical detail supports Chapter 7.
- Appendix K, *California Tiger Salamander Hybridization*, provides technical details supporting the conservation strategy for California tiger salamander in Chapter 5.
- Appendix L, *Fish Habitat Assemblage Data*, provides an overview of mapping methods and results for native fish communities in the study area.
- Appendix M, *Western Burrowing Owl Conservation Strategy*, provides details on the conservation strategy for the western burrowing owl which are summarized in Chapter 5.
- Appendix N, *Burrowing Owl Population Viability Analysis Santa Clara Valley Habitat Conservation Plan/Natural Communities Conservation Plan (HCP/NCCP)—March 2010*, is a technical report supporting the western burrowing owl conservation strategy (Appendix M).
- Appendix O, *List of Acronyms and Abbreviations*, lists the acronyms and abbreviations used in this document. It can be folded out for convenient reference.

Table 1-1. Local Planning Documents and Time Horizons Relevant to the Permit Term

Document	Date Produced	Projection/ Time Horizon	Plan Duration
Bay Area Integrated Regional Water Management Plan (SCVWD)	2006	2026	20 years
City of Gilroy General Plan	2000 (adopted in 2002)	2020	18 years
City of Morgan Hill General Plan	July 2001; as amended to July 2006	2025	24 years
City of San José General Plan	2011	2040	30 years
County of Santa Clara General Plan	1994; updated 2001	2010	16 years
Coyote Watershed Stream Stewardship Plan (SCVWD)	2002	At least until 2016	14 years
Guadalupe Watershed Stream Stewardship Plan (SCVWD)	2006	living document	Not defined
Fisheries and Aquatic Habitat Collaborative Effort (FAHCE) Settlement Agreement and Three Creeks HCP (SCVWD)	Under development	—	50 years
Flood Protection and Stream Stewardship Program (SCVWD) (capital improvements are included in this plan)	Adopted by the Board of Directors and approved by the voters in November 2000	2001–2016	15 years
Pajaro River Watershed Integrated Regional Water Management Plan	2007	2027	20 years
South County Airport Master Plan Report (Santa Clara County)	2006	2025	20 years
Strategic Plan for the Santa Clara County Parks and Recreation System	2003	2013	10 years
Urban Water Management Plan 2005 (SCVWD)	2005	2030	25 years
Valley Transportation Plan 2035 (VTA)	2009	2035	25 years

Sources: City of Gilroy 2002; City of Morgan Hill 2001; City of San José 2011; County of Santa Clara 1994, 2006; County of Santa Clara, Parks and Recreation Department 2003; Santa Clara Valley Water District 2000, 2002a, 2002b, 2005b; Santa Clara Valley Transportation Authority 2009.

Table 1-2. Species Proposed for Coverage in the Santa Clara Valley Habitat Plan

Species	Scientific Name	Status[1] State/CNPS	Federal
Invertebrates			
Bay checkerspot butterfly	*Euphydryas editha bayensis*	–	FT
Amphibians and Reptiles			
California tiger salamander	*Ambystoma californiense*	ST	FT
California red-legged frog	*Rana draytonii*	CSC	FT
Foothill yellow-legged frog	*Rana boylii*	CSC	–
Western pond turtle	*Clemmys marmorata*	CSC	–
Birds			
Western burrowing owl	*Athene cunicularia hypugea*	CSC	MBTA
Least Bell's vireo	*Vireo bellii pusillus*	SE	FE, MBTA
Tricolored blackbird	*Agelaius tricolor*	CSC	MBTA
Mammals			
San Joaquin kit fox	*Vulpes macrotis mutica*	ST	FE
Plants			
Tiburon Indian paintbrush	*Castilleja affinis* ssp. *neglecta*	ST/1B	FE
Coyote ceanothus	*Ceanothus ferrisiae*	1B	FE
Mount Hamilton thistle	*Cirsium fontinale* var. *campylon*	1B	–
Santa Clara Valley dudleya	*Dudleya abramsii* ssp. *setchellii*	1B	FE
Fragrant fritillary	*Fritillaria liliacea*	1B	–
Loma Prieta hoita	*Hoita strobilina*	1B	–
Smooth lessingia	*Lessingia micradenia* var. *glabrata*	1B	–
Metcalf Canyon jewelflower	*Streptanthus albidus* ssp. *albidus*	1B	FE
Most beautiful jewelflower	*Streptanthus albidus* ssp. *peramoenus*	1B	–

Notes:

[1] Status

Federal

FE Federally Endangered.
FT Federally Threatened.
BGPA Bald and Golden Eagle Protection Act.
MBTA Migratory Bird Treaty Act.
SOC Species of Concern (National Marine Fisheries Service only).

State

SE State Listed as Endangered.
ST State Listed as Threatened.
SR State Listed as Rare.
SC Candidate.
CSC California Special Concern Species.
FP Fully Protected.

California Native Plant Society (CNPS)

1B Rare, Threatened, or Endangered in California and Elsewhere.

Table 1-3. Checklist for NCCP Act Requirements

Requirement (Fish and Game Code Section)	Applicable Habitat Plan Sections[1]
The plan was developed in accordance with the process identified in the planning agreement per Section 2810. (2820(a)(1))	Chapter 1 *Introduction*, Section 1.1.3 *Background* and Section 1.3.1 *Federal and State Endangered Species Laws* subheading *Natural Community Conservation Planning Act* Chapter 8 *Plan Implementation*, Section 8.6.2 *Land Acquired by Other Organizations or through Partnerships* subheading *Land Acquisition during Plan Development* (*Interim Conservation*)
The plan integrates adaptive management strategies that are periodically evaluated and modified based on information from monitoring programs and other sources; these strategies assist conservation of covered species and ecosystems within the plan area. (2820(a)(2))	Chapter 5, *Conservation Strategy*, Section 5.3, *Conservation Actions* Chapter 6 *Conditions on Covered Activities and Application Process*, Section 6.3 *Conditions on All Covered Activities* Chapter 7 *Monitoring and Adaptive Management Program*, Section 7.1.1 *Regulatory Context*, Section 7.1.2 *Adaptive Management*, and Section 7.3 *Monitoring and Management Actions* Figure 7-2 *Adaptive Management Process*
[The plan] Protects habitat, natural communities, and species diversity on a landscape or ecosystem basis through the creation and long-term management of habitat reserves or other measures that provide equivalent conservation of covered species appropriate for land, aquatic, and marine habitats within the plan area. (2820(a)(3))	Chapter 1 *Introduction*, Section 1.1.2 *Purpose* Chapter 5 *Conservation Strategy*, Section 5.2.3 *Reserve System*, Section 5.2.4 *Aquatic Habitat Protection and Enhancement*, Section 5.2.5 *Land Management*, Section 5.3.1 *Land Acquisition and Restoration Actions* through Section 5.3.7 *Wetland and Pond Conservation and Management*
[The plan] Conserves, restores, and manages representative natural and semi-natural landscapes to maintain the ecological integrity of large habitat blocks, ecosystem function, and biological diversity. (2820(a)(4)(A))	Chapter 3 *Physical and Biological Resources*, Section 3.3.1 *Definitions*, Section 3.3.4 *Biological Diversity of the Study Area*, and Section 3.3.5 *Natural Communities and Land-Cover Types* (ecosystems discussed in each Natural Community) Chapter 5 *Conservation Strategy*, Section 5.2.3 *Reserve System*, Section 5.2.4 *Aquatic Habitat Protection and Enhancement*, Section 5.2.5 *Land Management*, Section 5.3.1 *Land Acquisition and Restoration Actions* through Section 5.3.7 *Wetland and Pond Conservation and Management*
[The plan] Establishes one or more reserves or proposes other measures that provide equivalent conservation of covered species within the plan area and linkages between them and adjacent habitat areas outside of the plan area. (2820(a)(4)(B))	Chapter 5 *Conservation Strategy*, Section 5.2.3 *Reserve System* subheading *Landscape Linkages*, Section 5.2.4 *Aquatic Habitat Protection and Enhancement*, and Section 5.3.1 *Land Acquisition and Restoration Actions* Table 5-9 *Landscape Linkages in and Near the Study Area Considered for the Reserve Design* Table 5-5 *Existing Open Space and Interim Conservation Lands Proposed for the Reserve System and Specific Conservation Actions within Each Site* Figure 5-6 *Potential Landscape Linkages in and Near the Study Area* Figure 5-8 *Land Acquisition Strategy with Applicable Landscape Linkages*

Requirement (Fish and Game Code Section)	Applicable Habitat Plan Sections[1]
[The plan] Protects and maintains habitat areas that are large enough to support sustainable populations of covered species. (2820(a)(4)(C))	Chapter 5 *Conservation Strategy*, Section 5.2.1 *Biological Goals and Objectives* subheading *Natural Community–Level Goals*, and Section 5.4 *Benefits of and Additional Conservation Actions for Covered Species* (descriptions for each covered species) Table 5-16 *Species Occurrences, Impacts, and Conservation Requirements for Covered Plants* Table 5-17 *Commitments to Acquire and Enhance Modeled Habitat in the Reserve System for Covered Species with Models (acres)*
[The plan] Sustains the effective movement and interchange of organisms between habitat areas to maintain ecological integrity of habitat within the plan area. (2820(a)(4)(E))	Chapter 3 *Physical and Biological Resources*, Section 3.3.1 *Definitions* subheading *Ecological Integrity* Chapter 5 *Conservation Strategy*, Section 5.2.3 *Reserve System* subheading *Landscape Linkages*, Section 5.2.4 *Aquatic Habitat Protection and Enhancement*, Section 5.3.1 *Land Acquisition and Restoration Actions*, and Section 5.3.2 *Landscape Conservation and Management* subheading *Connectivity and Permeability* Table 5-9 *Landscape Linkages in and Near the Study Area Considered for the Reserve Design* Figure 5-6 *Potential Landscape Linkages in and Near the Study Area* Figure 5-8 *Land Acquisition Strategy with Applicable Landscape Linkages*
The plan incorporates a range of environmental gradients (such as slope, elevation, aspect, and coastal or inland characteristics) and high habitat diversity; this provides for shifting distributions of species due to changed circumstances. (2820(a)(4)(D))	Chapter 3 *Physical and Biological Resources*, Section 3.2.2 *Topography*, Section 3.2.4 *Soils*, Section 3.2.5 *Climate and Hydrology*, Section 3.3.1 *Definitions* subheading *Environmental Gradients* Figure 3-1 *Santa Clara Valley HCP/NCCP Topography* Figure 3-2 *Santa Clara Valley HCP/NCCP Slope in Degrees* Figure 3-3 *Soils in the Santa Clara Valley HCP/NCCP Area* Figure 3-4 *Santa Clara Valley HCP/NCCP Serpentine Areas* Figure 3-5 *Average Annual Rainfall in HCP/NCCP Study Area* Figure 3-6 *Santa Clara Valley HCP/NCCP Watersheds* Chapter 5 *Conservation Strategy*, Section 5.3.2 *Landscape Conservation and Management* subheading *Biological Goals and Objectives* Table 5-1a *Biological Goals, Objectives and Conservation Actions: Landscape Level* Table 5-11 *Land Acquisition and Enhancement Requirements within the Study Area for Selected Terrestrial Land-Cover Types (acres)*

Requirement (Fish and Game Code Section)	Applicable Habitat Plan Sections[1]
The plan identifies allowable activities and restrictions within reserve areas compatible with conservation of species, habitats, natural communities, and associated ecological functions. (2820(a)(5))	Chapter 2 *Land Use and Covered Activities*, Section 2.3.8 *Conservation Strategy Implementation* Chapter 4 *Impact Assessment and Level of Take*, Section 4.3.7 *Conservation Strategy Implementation* subheading *Activities within the Reserve System* Chapter 6 *Conditions on Covered Activities and Application Process*, Section 6.4.6 *Reserve System Implementation* subheadings *Condition 9. Prepare and Implement a Recreation Plan* and *Condition 10. Fuel Buffer*, Section 6.5 *Conditions to Minimize Impacts on Natural Communities* subheading *Condition 11. Stream and Riparian Setbacks* (most other Conditions also apply to the Reserve System)
The plan contains specific conservation measures that meet the biological needs of covered species and that are based on the best available scientific information about the status of covered species and the impacts of permitted activities on those species. (2820(a)(6))	Chapter 3 *Physical and Biological Resources*, Section 3.3.3 *Covered Species* Chapter 5 *Conservation Strategy*, Section 5.4 *Benefits of and Additional Conservation Actions for Covered Species* Table 5-1c *Biological Goals, Objectives and Conservation Actions: Wildlife* Table 5-1d *Biological Goals, Objectives and Conservation Actions: Plants* Chapter 6 *Conditions on Covered Activities and Application Process* Appendix D *Species Accounts* (for best available scientific information on the covered species)
The plan contains a monitoring program. (2820(a)(7))	Chapter 7 *Monitoring and Adaptive Management Program*
The plan contains an adaptive management program. (2820(a)(8))	Chapter 7 *Monitoring and Adaptive Management Program*
The plan includes an estimated timeframe and process for implementing reserves or other conservation measures, including obligations of landowners and plan signatories and consequences for failure to acquire lands in a timely manner. (2820(a)(9))	Chapter 5 *Conservation Strategy*, Section 5.3.1 *Land Acquisition and Restoration Actions* subheading *Stay-Ahead Provision and Rough Proportionality* Tables 5-1a and 5-1b *Biological Goals, Objectives and Conservation Actions: Landscape-Level and Natural Community-Level* Table 5-14 *Commitments by Time Period for Restoration and Creation Requirements that Contribute to Species Recovery* Chapter 8 *Plan Implementation*, Section 8.6.1 *Stay-Ahead Provision*
The plan ensures that mitigation and conservation measures are roughly proportional in time and extent to the impact on habitat or covered species authorized under the plan. These provisions identify (a) the conservation measures—including assembly of reserves where appropriate and implementation of monitoring and management activities—that the landowner will maintain or carry out in rough proportion to the impact on habitat or covered species and (b) the measurements that will be used to determine if this occurs. (2820(b)(3)(D)(9))	Chapter 5 *Conservation Strategy*, Section 5.3.1 *Land Acquisition and Restoration Actions* subheading *Stay-Ahead Provision and Rough Proportionality* Table 5-1a *Biological Goals, Objectives and Conservation Actions: Landscape Level* Table 5-1b *Biological Goals, Objectives and Conservation Actions: Natural Community Level* Table 5-1c *Biological Goals, Objectives and Conservation Actions: Wildlife* Table 5-1d *Biological Goals, Objectives and Conservation Actions: Plants*

Requirement (Fish and Game Code Section)	Applicable Habitat Plan Sections[1]
	Table 5-11 *Land Acquisition and Enhancement Requirements within the Study Area for Selected Terrestrial Land-Cover Types* (acres) Table 5-12 *Required Preservation, Enhancement, Restoration and Creation Mitigation Ratios and Estimated Acquisition, Enhancement, Restoration, and Creation Requirements for Aquatic Land Cover Types* Table 5-16 *Species Occurrences, Impacts, and Conservation Requirements for Covered Plants* Chapter 8 *Plan Implementation*, Section 8.6.1 *Stay-Ahead Provision*
The plan ensures adequate funding to carry out the conservation measures identified in the plan. (2820(a)(10))	Chapter 9 *Costs and Funding*, Section 9.4 *Funding Sources and Assurances* Table 9-5 *Funding Sources*
The plan defines species coverage, including any conditions of coverage (2820(b)(1)). The plan establishes long-term protection of habitat reserves or provides equivalent conservation of covered species (2820(b)(2)).	Chapter 3 *Physical and Biological Resources*, Section 3.3.3 *Covered Species* Chapter 5 *Conservation Strategy*, Section 5.2.3 *Reserve System*, Section 5.2.4 *Aquatic Habitat Protection and Enhancement*, and Section 5.3.1 *Land Acquisition and Restoration Actions*
The plan defines specific terms and conditions, which, if violated, would result in the suspension or revocation of the permit, in whole or in part. CDFG will include a provision requiring notification to the plan participant of a specified period of time to cure any default prior to suspension or revocation of the permit in whole or in part. These terms and conditions will address, but are not limited to, provisions specifying the actions CDFG will take under all of the following circumstances (2820(b)(3)): The plan participant fails to provide adequate funding. The plan participant fails to maintain the rough proportionality between impacts on habitat or covered species and conservation measures. The plan participant adopts, amends, or approves any plan or project without the concurrence of the wildlife agencies that is inconsistent with the objectives and requirements of the approved plan. The level of take exceeds that authorized by the permit.	Chapter 5 *Conservation Strategy*, Section 5.3.1 *Land Acquisition and Restoration Actions* subheading *Stay-Ahead Provision and Rough Proportionality* Chapter 6, *Conditions on Covered Activities and Application Process*, Section 6.1 *Introduction* (regarding approval of plans or project inconsistent with the Plan) Chapter 8 *Plan Implementation*, Section 8.6.1 *Stay-Ahead Provision* Chapter 9 *Costs and Funding*, Section 9.4 *Funding Sources and Assurances*, Section 9.4.4 *Funding Adequacy* Table 9-5 *Funding Sources* Implementing Agreement, Section 16.3 *Suspension of the State Permit*
The plan specifies procedures for amendment of the plan and the implementation agreement (2820(b)(4)).	Chapter 10 *Assurances*, Section 10.3 *Modifications to the Plan*
The plan ensures implementation of a monitoring program and adaptive management program. (2820(b)(5)).	Chapter 7 *Monitoring and Adaptive Management Program*, Section 7.1.1 *Regulatory Context*
The plan provides for oversight of plan implementation to assess mitigation performance, funding, and habitat protection measures. (2820(b)(6))	Chapter 8 *Plan Implementation*, Section 8.3.8 *Reserve Management and Monitoring* subheading *Structure of the Adaptive Management Decision-Making Process* and Section 8.10 *Data Tracking*

Table 1-3. Continued

Requirement (Fish and Game Code Section)	Applicable Habitat Plan Sections[1]
The plan provides for periodic reporting to the wildlife agencies and the public for purposes of information and evaluation of plan progress. (2820(b)(7))	Chapter 8 *Plan Implementation*, Section 8.11 *Reporting*
The plan provides mechanisms to ensure adequate funding to carry out the conservation actions identified in the plan. (2820(b)(8))	Chapter 9 *Costs and Funding*, Section 9.4 *Funding Sources and Assurances* Table 9-5 *Funding Sources*
The plan stipulates that if a participant does not maintain proportionality between *take* and conservation measures specified in the implementation agreement and does not either (a) cure the default within 45 days or (b) enter into an agreement with CDFG within 45 days to expeditiously cure the default, CDFG will suspend or revoke the permit, in whole or in part. (2820(c))	Chapter 8 *Plan Implementation*, Section 8.6.1 *Stay-Ahead Provision* subheading *Measurement of Stay-Ahead Provision* Implementing Agreement, Section 16.3.1 *Failure to Maintain Rough Proportionality*
The plan requires that data and reports associated with monitoring programs be available for public review; the landowner must also conduct public workshops on an annual basis to provide information and evaluate progress toward attaining the conservation objectives of the plan. (2820(d))	Chapter 7 *Monitoring and Adaptive Management Program*, Section 7.4 *Data and Reporting*, and Section 7.2.3 *Program Implementation* subheading *Program Infrastructure* Chapter 8 *Plan Implementation*, Section 8.2.7 *Public Input*, and Section 8.11 *Reporting*

Note:

[1] Only the primary applicable sections of the Plan are listed. Other sections may apply or be cross-referenced by the sections listed in this table.

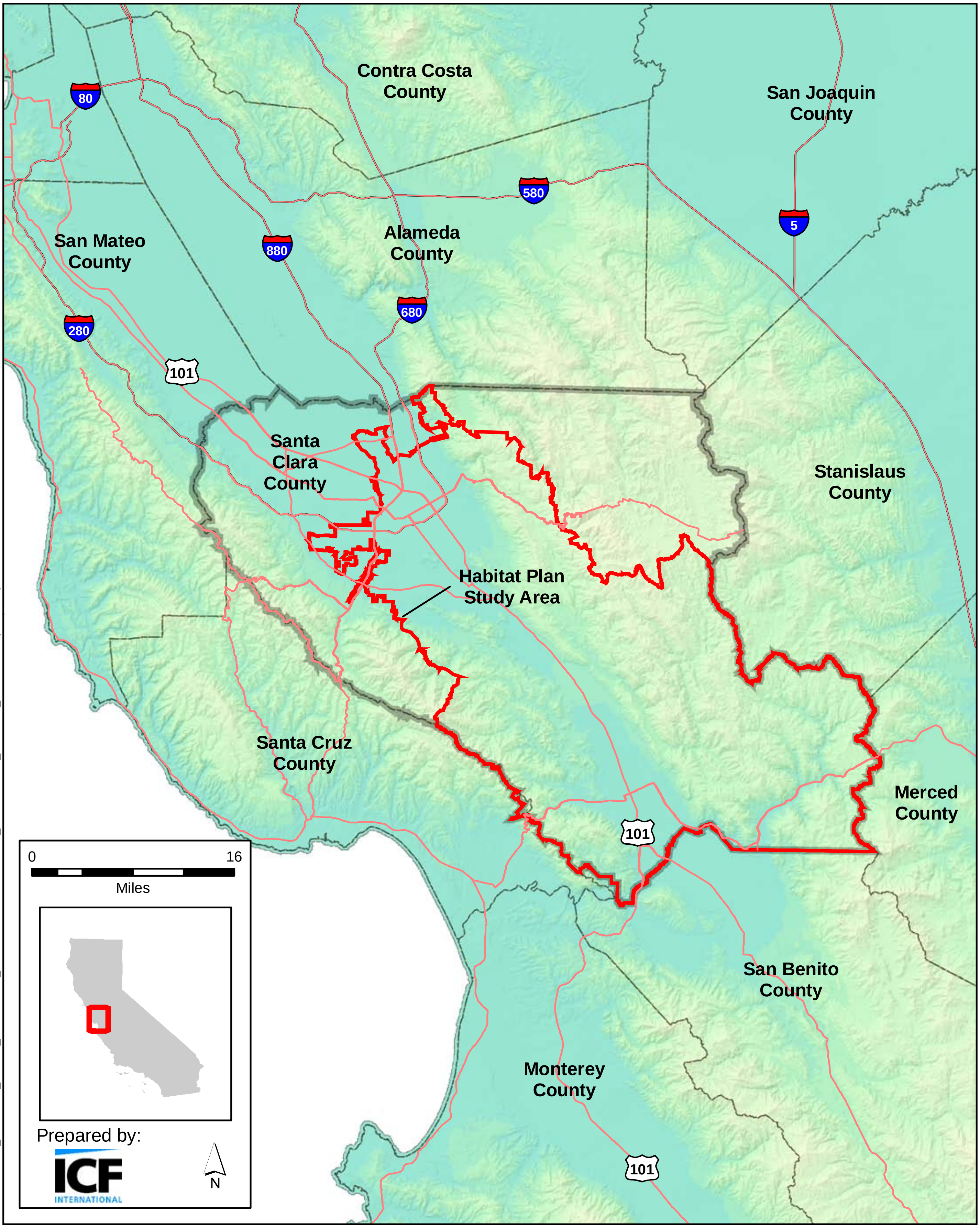

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Figure 1-1
Regional Location of the Habitat Plan Study Area

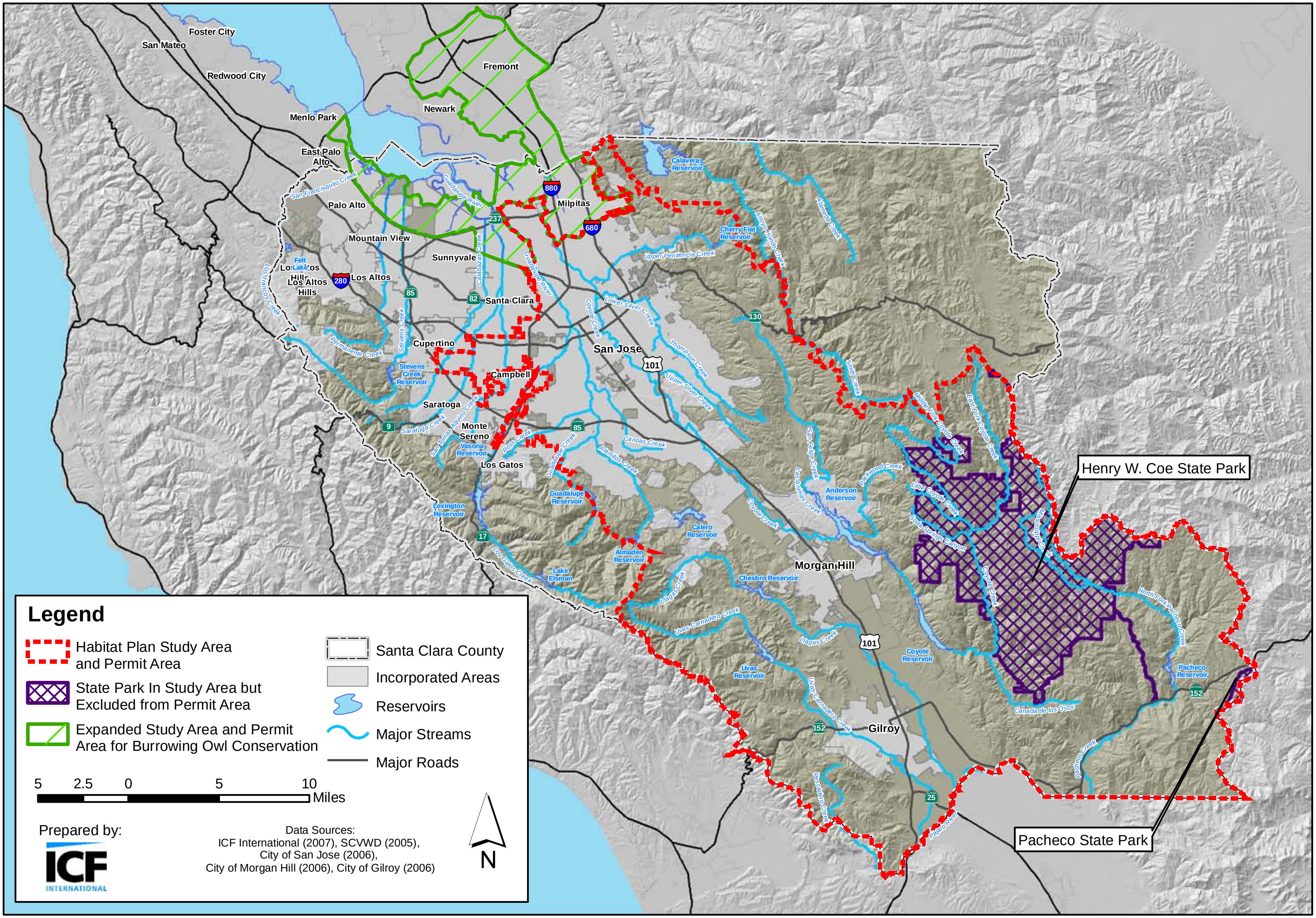
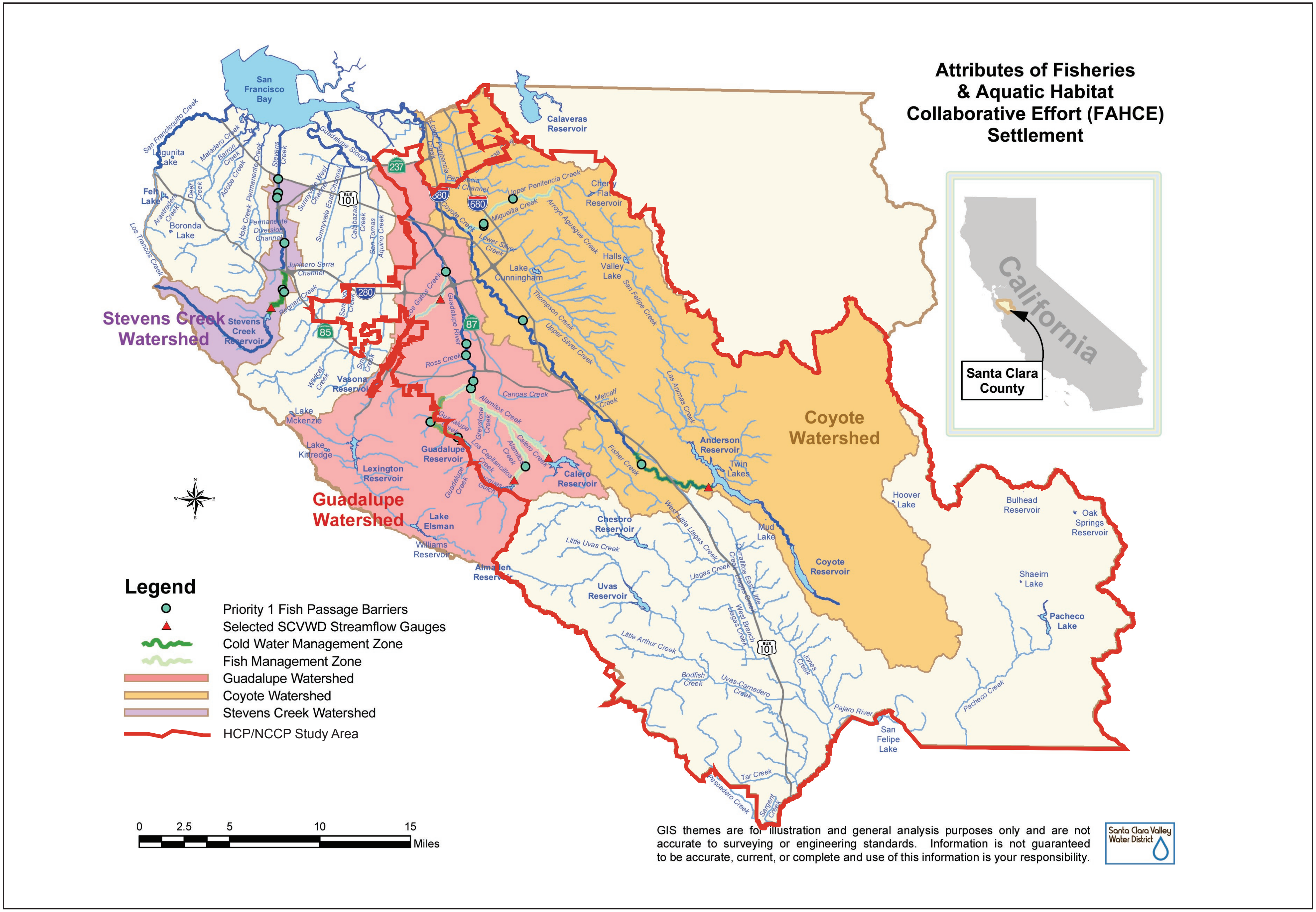


Figure 1-2
Santa Clara Valley Habitat Plan Study Area and Permit Area



GIS themes are for illustration and general analysis purposes only and are not accurate to surveying or engineering standards. Information is not guaranteed to be accurate, current, or complete and use of this information is your responsibility.

Santa Clara Valley Water District

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Figure 1-3
FAHCE Program Boundary

Chapter 2
Land Use and Covered Activities

2.1 Introduction

This chapter examines existing land use conditions and land use plans in the study area, and describes activities covered under the Plan. The land use component of this chapter provides an overview of the major land use and open space management agencies operating within the study area and provides a brief description of each agency's mission and jurisdiction. The description of land use provides the necessary context for the covered activities upon which the impact analysis (Chapter 4) is based. This chapter provides history and context for future development in the study area, reviews existing land-use conditions and relevant land use plans; presents the criteria used to determine land use categories for the Plan; discusses significant existing open spaces in the study area and open space type classification; and describes the projects and activities within the permit area that will be covered under the incidental take permits.

2.2 Land Use and Jurisdictions

2.2.1 Existing Conditions

Santa Clara County encompasses 835,449 acres (1,305 square miles), 519,506 acres (810 square miles, or 62% of the County) of which are included in the study area of this Plan. The fertile Santa Clara Valley (Valley) runs the entire length of the County from north to south, ringed by the rolling hills of the Diablo Range on the east and the Santa Cruz Mountains on the west. Salt marshes, tidal wetlands, and mostly abandoned salt ponds lie in the northern part of the County, adjacent to San Francisco Bay (County of Santa Clara 2006a) (see **Figure 1-1** for the regional location of the Plan study area).

The Valley is generally split into two geographic regions, the North Valley and the South Valley. The North Valley is extensively urbanized and houses approximately 90% of the County's residents. Thirteen of the County's fifteen cities are located in the North Valley, while the remaining two cities, Gilroy and Morgan Hill, are located in the South Valley. The South Valley remains predominantly rural, with the exception of Gilroy, Morgan Hill, small unincorporated community of San Martin, and scattered residential areas generally having parcels of five acres or smaller that were created in or before the

1960s. Low-density residential developments are also scattered along the Valley floor and foothill areas (County of Santa Clara 2006b).

Once known as the "Valley of Heart's Delight," orchards and other agriculture dominated this area in the early to mid-20th century. Over the past several decades, the County has transformed into "Silicon Valley," a major global center of high-tech development and the Internet boom of the 1990s. The population growth of the County reflected this dramatic shift in local industry. Between 1980 and 1990, Santa Clara County grew by 202,506 people (16%). Similarly, between 1990 and 2000, the County grew by an additional 185,008, a 12% increase in population. Between 1990 and 2000, most of the population growth in Santa Clara County occurred in San José and in the North Valley cities (Campbell, Cupertino, Los Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Mountain View, Palo Alto, Santa Clara, Saratoga, and Sunnyvale). Although North Valley cities experienced a larger increase in population numbers, the South Valley cities of Morgan Hill and Gilroy experienced a larger-than-average percentage increase in population (County of Santa Clara 2006b).

The County's current population of over 1.7 million is one of the largest in the state and is the largest of the nine Bay Area counties. Its population constitutes approximately one-fourth of the Bay Area's total population and the County provides more than 25% of all jobs in the Bay Area. Nearly 92% of the County population lives in its cities (County of Santa Clara 2006a). Of the fifteen cities located in Santa Clara County, only Gilroy, Morgan Hill, and San José are covered by the Plan.

It is predicted that the County's population will continue to grow, but at a slower rate than in the recent past. Moderate rates of growth in employment and housing development may account for this slowdown in population growth (County of Santa Clara 2006b). According to the Association of Bay Area Governments, Santa Clara County's population is projected to reach 1,855,500 by 2010 and 2,073,300 by 2020 (Association of Bay Area Governments 2005).

The Association of Bay Area Governments develops population projections for Bay Area cities and counties every two years. City populations generally include the full Local Agency Formation Commission (LAFCO)-defined sphere of influence. In 2005, the cities of Gilroy, Morgan Hill and San José had a total population of 1,079,500, 62% of the County's population. The population of these cities is projected to reach 1,310,400 by 2010 and 1,455,800 by 2020, 62% and 63% of projected County population, respectively. The population of Santa Clara County exclusive of the cities was 15,400 (Association of Bay Area Governments 2005).

As early as 1970, the County and cities of the Valley anticipated this type of rapid growth and began implementing policies that would help guide development, curtail sprawl, and protect the abundant natural resources of the region. A critical policy was and is that urban growth would occur within cities and not in unincorporated Santa Clara County. After several decades, the County remains keenly aware of the need to guide development so that social, economic, and environmental resources are protected. Many of the policies in the current

County general plan address land use issues involving the rural unincorporated areas of the County over which the County has direct land use authority. The overall direction of these policies is to maintain the scenic rural character of these areas and to promote conservation and productive use of their natural resources for agriculture, ranching, watershed, public recreation, and wildlife habitat.

An important cornerstone of the County general plan is a vision of “compact development” as an overall approach to managing future growth. Compact development means that most future growth is directed into appropriate locations within existing urban areas, particularly along transit corridors and closer to employment centers rather than sprawling outward into the hillsides and the rural countryside.

The Cities of Gilroy, Morgan Hill, and San José maintain a strong commitment to protect the natural and agricultural resources surrounding their respective cities. Reflecting this vision, Morgan Hill and San José, have adopted an ultimate buildout line (termed the “planning limit of urban growth” for the purposes of this Plan). Gilroy’s General Plan 2020 urban expansion line may be extended in future general plan updates (for additional detail, see Section 2.4 *Projects and Activities Not Covered by this Plan*). More detail on each city’s development and open space policies, and planning limit of urban growth boundaries is provided below.

Background information for each of the Local Partners is provided below.

Gilroy

Gilroy, known as the “Garlic Capital of the World,” is located close to the southern border of Santa Clara County where U.S. 101 intersects with State Route (SR) 152. Gilroy is known for its rural residential environment, its award-winning parks, and for its “urban forest,” for which the City has won Tree City USA awards annually since 1979 (City of Gilroy 2006a).

The City of Gilroy adopted its most recent general plan on June 13, 2002 (City of Gilroy 2002a). This document is a statement of community values and priorities, projecting out to the year 2020. The vision for Gilroy’s future emphasizes a compact pattern of development, surrounded by open space and working agricultural lands, helping to retain the City’s small-town character and rural atmosphere. In addition to the general plan, Gilroy recently developed the Hecker Pass Specific Plan to “protect and enhance the Hecker Pass Area’s rural character, open space, and agricultural uses” (City of Gilroy 2005b).

The City of Gilroy anticipates buildout of the city will occur within the existing general plan boundary over the course of the Plan permit term. Therefore, the City’s general plan boundary will be used to represent the City’s planning limit of urban growth for this Plan. The general plan boundary is the area of evaluation in the City of Gilroy General Plan that represents a 20-year development time frame. The general plan was adopted in 2002 and represents a buildout to 2020 (C. Casper pers. comm.).

Population, Housing, and Employment

The population of Gilroy was 47,671 people in 2005 and is projected to reach 64,600 in 2020 and 66,400 in 2030, an increase of 36% and 39% over 2005 values, respectively[1].

Households in Gilroy numbered 15,450 in 2005. The number of households is projected to reach 18,350 in 2020 and 19,050 in 2030, an increase of 19% and 23% over 2005 values, respectively.

Jobs in Gilroy numbered 22,430, or 2.1% of total jobs Countywide, in 2005. The number of jobs is projected to reach 32,690 in 2020 and 34,950 in 2030, 2.8% and 2.6% of projected jobs Countywide, respectively (Association of Bay Area Governments 2005).

Conservation and Open Space Policies

The City of Gilroy has adopted several policies related to protection and conservation of open space. A selection of these policies from the general plan and from the Hecker Pass Specific Plan is listed below (City of Gilroy 2002a, 2005b).

Gilroy General Plan

Policy 20.01, Open Space Areas; Policy 20.02, Creek Protection. Ensure protection of creeks (including small canyons and seasonal creeks) that flow through the area, preserving their natural drainage function through adequate setbacks and easements.

Policy 1.09, Clustered Development; Policy 20.01, Open Space Areas; Policy 20.03, Plant and Wildlife Habitats; Policy 20.04, Rare and Endangered Species. Ensure protection of natural resource and wildlife habitat areas.

Policy 1.09, Clustered Development; Policy 20.01, Open Space Areas. Respect the natural topography to the greatest extent possible, retaining significant natural features such as hillsides, trees, and heavily vegetated areas.

[1] Population, housing, and employment information presented in this chapter is taken from the Association of Bay Area Governments 2005 projections. The projections for each city include lands currently annexed to the city, as well as all currently unincorporated lands within its sphere of influence. Projections for Santa Clara County do not include unincorporated lands within the sphere of influence of the cities. These boundaries are inconsistent with the local growth boundaries of the study-area cities, as discussed later in this chapter.

Hecker Pass Specific Plan

> **Development Controls and Design Standards: Open Space.** A variety of open space areas should be created through the design and development process, including active recreation areas, habitat protection areas, agricultural areas, scenic open spaces, and neighborhood open spaces (interspersed between clusters of residential development). For all open spaces, the Specific Plan should ensure (a) that open space dedications are permanent, and (b) that appropriate mechanisms are in place to address ongoing maintenance and management issues.

Morgan Hill

Morgan Hill is located in southern Santa Clara Valley, approximately 12 miles south of San José, 10 miles north of Gilroy, and 15 miles inland from the Pacific Coast (City of Morgan Hill 2006). The City of Morgan Hill developed its current general plan in 2001 and made revisions to the plan in 2006 to adopt an urban limit line and greenbelt policies. The general plan envisions:

> Morgan Hill keeping its small-town character while offering new opportunities for businesses and amenities for residents. Agriculture will continue at the outskirts, and new housing for a range of incomes will be accommodated in a variety of locations. Urban land uses will be encouraged around the downtown, and incentives would foster infill development instead of sprawl. (City of Morgan Hill 2006.)

The City of Morgan Hill anticipates ultimate buildout of the city will occur within its Urban Limit Line adopted in April, 2006. Therefore, the City's Urban Limit Line will be used to represent the City's planning limit of urban growth for this Plan. The Urban Limit Line separates urban and future urban areas from rural areas. The Urban Limit Line is a longer-term version of the City's Urban Growth Boundary and is intended to reflect the City's long-term policy for growth in Morgan Hill, beyond the 20-year time frame of the Urban Growth Boundary. The purpose of the Urban Limit Line is to encourage more efficient growth patterns, minimize public costs, and protect environmental resources. Some, but not all, of the land outside the Urban Limit Line has been identified as Greenbelt (S. Golden pers. comm.).

Population, Housing, and Employment

The population of Morgan Hill was 36,423 people in 2005 and is projected to reach 48,000 in 2020 and 50,000 in 2030, an increase of 32% and 37% over 2005 levels, respectively.

Households in Morgan Hill numbered 13,330 in 2005. The number of households is projected to reach 15,590 in 2020 and 16,140 in 2030, an increase of 17% and 21% over 2005 values, respectively.

Jobs in Morgan Hill numbered 14,520, or 1.4% of total jobs Countywide, in 2005. The number of jobs is projected to reach 21,760 in 2020 and 25,570 in 2030, 1.9% and 2.1% of projected jobs Countywide, respectively (Association of Bay Area Governments 2005).

Conservation and Open Space Policies

The City of Morgan Hill General Plan contains many policies supporting habitat conservation and preservation. The following policies are just a few examples taken from the Open Space and Conservation element of the general plan (City of Morgan Hill 2001a, 2001b, 2006).

1a. Work with the County, the Santa Clara Valley Open Space Authority, appropriate conservancy organizations and land trusts, and property owners to preserve large open space areas, such as agricultural lands and outdoor recreation areas to conserve natural resources, retain the city's unique identity.

1b. Support agricultural uses that can preserve open space.

1c. Preserve and maintain the wide variety of open spaces in the South County. Greenbelts should delineate and provide contrast between the city and adjacent urban areas. A system of city and regional parks should be linked by pedestrian ways, trails, and streamside parks. (South County Joint Area Plan [SCJAP] 16.00.)

5a. Encourage reclamation of degraded streams and riparian areas.

5b. Maintain riparian systems, stream banks and floodways in open space or related open space uses such as wildlife habitat, recreation or agriculture. (SCJAP 16.10.)

5c. A proposed streamside park along West Little Llagas Creek should be actively implemented and connected to the County trail system. (SCJAP 16.10 & 16.12.)

5d. Retain natural streamside and riparian areas in their natural state in order to preserve their value as percolation and recharge areas, natural habitat, scenic resources, recreation corridors and for bank stabilization. (SCJAP 15.08.)

5e. Where flood control projects are needed to protect existing development, minimize disruption of streams and riparian systems, maintaining slow flow and stable banks through design and other appropriate mitigation measures. (SCJAP 15.08.)

6a. Preserve all fish and wildlife habitats in their natural state whenever possible. Consider development impacts upon wildlife and utilize actions to mitigate those environmental impacts.

The City of Morgan Hill also adopted in 2003 and is now implementing a habitat mitigation plan for the western burrowing owl (City of Morgan Hill 2003). To date, Morgan Hill has preserved one approximately 30-acre site to provide suitable habitat for burrowing owl (Live Oak Associates 2006).

San José

San José, founded in 1777, was California's first civilian settlement. San José is located in the North Valley, on the eastern side of the Valley and adjacent to the southern tip of the San Francisco Bay. San José is by far the largest city in Santa Clara County, the third largest city in California (after Los Angeles and San Diego), and the tenth largest city in the United States.

Most of the City of San José lies within the study area. Approximately 9% of the city (10,543 acres) is excluded from the study area. (See Chapter 1 for a discussion of how the study area was defined.) Land use in San José is varied and includes a large urban core, as well as approximately 13,780 acres (12% of the incorporated city) of non-urban hillside.

The City of San José 2040 General Plan identifies several "Major Strategies" that represent central themes of planning in the City through 2040. The Greenline/Urban Growth Boundary Major Strategy is directed at preserving the scenic backdrop of the hillsides surrounding San José, preserving land that protects water, habitat, or agricultural resources, and offers recreational opportunities (City of San José 2011).

The City adopted Measure K, the establishment of the Greenline/Urban Growth Boundary, in 2000 with over 81% of voter support. The stated intention of the ballot measure was to develop a clearer geographic identity for San José as well as to preserve valuable open space resources. This line is the anticipated ultimate boundary of urban growth for San José, and the city has several policies in place that would prohibit the expansion of the Greenline/Urban Growth Boundary. As a requirement of the 2000 ballot measure, the boundary may only be repealed or amended by the voters of the City of San José (M. Mena pers. comm.). Therefore, the City's Greenline/Urban Growth Boundary will be used to represent the City's planning limit of urban growth for this Plan.

The City of San José adopted the *Envision San José 2040 General Plan* in November 2011. The revisions do not include an expansion of the Greenline/Urban Growth Boundary.

Population, Housing, and Employment

The population of San José was 985,000 people in 2005 and is projected to reach 1,196,900 in 2020 and 1,339,400 in 2030, an increase of 22% and 36% over 2005 values, respectively.

Households in San José numbered 309,020 in 2005. The number of households is projected to reach 370,620 in 2020 and 417,790 in 2030, an increase of 20% and 35% over 2005 levels, respectively.

Jobs in San José numbered 375,750, or 36% of jobs Countywide, in 2005. The number of jobs is projected to reach 514,220 in 2020 and 617,790 in 2030, 44% and 46% of projected jobs Countywide, respectively (Association of Bay Area Governments 2005).

Conservation and Open Space Policies

The City of San José has adopted several policies related to the Greenline/Urban Growth Boundary, controlled growth, and protection and conservation of open space. A selection of these policies from the general plan is listed below (City of San José 2011).

- The Greenline/Urban Growth Boundary establishes the maximum extent of urban development. All urban and suburban development should occur within the Greenline/Urban boundary. Areas outside of this boundary are intended to remain permanently rural in character and to contribute to the establishment of a permanent green belt along the City's eastern and southern edges (pp.6-29).
- Prohibit significant modifications of the Greenline/Urban Growth Boundary, as defined by Title 18 of the municipal code, except through a Major General Plan Update process (pp. 6-29).
- Design development at the urban/natural community interface of the Greenline/ Urban Growth Boundary to minimize the length of the shared boundary between urban development and natural areas by clustering and locating new development close to existing development (pp. 3-31).
- Minimize grading on hillsides and design any necessary grading or recontouring to preserve the natural character of the hills and to minimize the removal of significant vegetation, especially native trees such as Valley oaks (pp. 6-26).
- Encourage the preservation of hillside vegetation and require appropriate revegetation and planting of non-invasive plant materials that do not require routine irrigation for projects in hillside areas, if existing vegetation must be removed or substantially disturbed (pp. 6-28).

Riparian Corridors (pp. 3-27)

- Preserve, protect, and restore the City's riparian resources in an environmentally responsible manner to protect them for habitat value and recreational purposes.
- New public and private development adjacent to riparian corridors should be consistent with the provisions of the Riparian Corridor Policy Study and any adopted Santa Clara Valley Habitat Conservation Plan/ Natural Communities Conservation Plan.

- Ensure that a 100-foot setback from riparian habitat is the standard to be achieved in all but a limited number of instances, only where no significant environmental impacts would occur.
- New development should be designed to protect adjacent riparian corridors from encroachment of lighting, exotic landscaping, noise and toxic substances into the riparian zone.
- The City encourages appropriate native plant restoration projects along riparian corridors, upland wetlands, and in adjacent upland areas.
- Develop a City Council Policy based on the City's Riparian Corridor Policy Study and HCP/NCCP to successfully implement the riparian goals and policies of the *Envision General Plan*, which recognizes that a 100-foot setback is the standard to be achieved in all but a limited number of instances, where no significant environmental impacts would occur.

Contemplates Adoption of HCP

The *Envision San José 2040 General Plan* also specifically contemplates the adoption of the Habitat Plan and incorporates the goals of the Habitat Plan as follows.

- A long-range plan to protect and enhance ecological diversity and function within a large section of Santa Clara County, while allowing for currently planned development and growth.
- Providing a framework for the protection of natural resources while streamlining and improving the environmental permitting process for both private and public development, including activities such as road, water, and other infrastructure construction and maintenance work.
- Providing environmental benefit resulting in the creation of a number of new habitat reserves larger in scale and more ecologically valuable than the fragmented, piecemeal habitats yielded by mitigating projects on an individual basis,

The San José 2040 General Plan further contemplates the adoption of the Habitat Plan and includes specific strategies to further the goals of the Habitat Plan by:

- Shaping growth in the City to minimize impacts on resource consumption, reduce contribution to global warming, and to preserve and enhance it natural environment (pp. 1-22, Major Strategy #7 – Measurable Sustainability/Environmental Stewardship.)
- Implementing the Habitat Plan to mitigate for land and stream development impacts and provide additional conservation, restoration, and enhancement efforts (pp. 3-27, ER-1.8).
- Ensuring that new public and private development adjacent to riparian corridors in San José are consistent with the Habitat Plan (pp. 3-27, 28).
- Locating trail right-of-ways consistent with the provisions of the Habitat Plan (pp. 4-54 PR-7.2).

- Including public and private habitat conservation as an authorized land use in the “Open Hillside” land use designation (pp. 5-18).
- Considering habitat conservation objectives as part of hillside development proposals (pp. 6-28, LU-17.7).
- Retaining the City’s urban growth boundary to limit urban development in order to, among other purposes, preserve as open space substantial areas of surrounding hillsides, baylands, and other lands to conserve natural resources (pp. 6-29-35, “Land Use Policies – Non-Urban Areas”).

Unincorporated Areas of Santa Clara County

Approximately 77% of the study area—398,250 acres—is in unincorporated areas of Santa Clara County. Existing development within the unincorporated area is concentrated in the small community of San Martin, located between Morgan Hill and Gilroy, and in the foothills adjacent to either side of the Santa Clara Valley. Other unincorporated communities and development areas in the County include New Almaden in San José’s South Almaden Valley urban reserve, Paradise Valley at the east end of Chesbro Reservoir, and along SR 152. In addition, small “pockets” of unincorporated urban areas exist within the urban service areas of San José and to a smaller extent, Morgan Hill and Gilroy.

Most of the County’s cultivated agricultural land is located along the floor of the South Valley, outside of the urbanized areas. Economically, agriculture is a small component of the County’s economy. The importance of agriculture relates primarily to the amount of land used for agricultural activities. Currently in Santa Clara County, approximately 20,900 acres are in irrigated agriculture; 87% of this agriculture is in unincorporated areas of the County, while 13% is in incorporated areas. Nearly all of this land is within the Plan study area. In addition to irrigated land, significant parts of the study area have historically been grazed by cattle and managed by ranchers. Cattle ranching continues over much of the lands in the study area, including on some public lands.

While some agriculture is located within cities, the majority of agricultural areas are located in the unincorporated County. Existing agricultural uses include bushberries and strawberries, field crops, floral crops (e.g., cut flowers), forest products, fruits and nuts (including grapes for wine making), livestock and poultry, milk and eggs, nursery crops, seed crops, and vegetable crops (County of Santa Clara, Division of Agriculture 2005). Range that is grazed constitutes the largest agricultural use. The Santa Clara County Division of Agriculture provides annual reports on the amount of acreage annually used for agriculture as well as the value of each crop in the County. Crops varyfrom year to year with the level at which a given crop is produced influenced by the annual value of the crop.

Ranchland and woodland land uses comprise a significant portion of the unincorporated portion of the County (approximately 49% of the entire County). Rangeland is generally located in the hills east and west of developed areas of the North and South Valleys.

The County of Santa Clara regulates land development within unincorporated areas (i.e., those areas in the County not under jurisdiction of any city). The County has not adopted any growth boundaries within its jurisdiction (R. Aggarwal pers. comm.). However, it does have policies and zoning which restrict denser development in the unincorporated areas (see *Conservation and Open Space Policies* section below).

Population, Housing, and Employment

The population of the unincorporated areas of the County was 15,400 people in 2005 and is projected to reach 16,600 in 2020 and 16,900 in 2030, an increase of 8% and 10% over 2005 values, respectively.

Households in the unincorporated County numbered 5,260 in 2005. The number of households is projected to reach 5,500 in 2020 and 5,600 in 2030, an increase of 5% and 6% over 2005 values, respectively.

Jobs in the unincorporated County numbered 2,590, or 0.2% of jobs Countywide, in 2005. The number of jobs is projected to reach 3,120 in 2020 and 3,180 in 2030, 0.3% and 0.2% of projected jobs Countywide, respectively (Association of Bay Area Governments 2005).

Conservation and Open Space Policies

The County developed its current general plan in 1995 and updated it in 2001. The County of Santa Clara, Parks and Recreation Department (County Parks) developed the *Strategic Plan for the Santa Clara County Parks and Recreation System* (County Parks Strategic Plan) in 2003 (County of Santa Clara, Parks and Recreation Department 2003). A selection of general plan and County Park Strategic Plan policies related to conservation and open space is listed below (County of Santa Clara 1994; County of Santa Clara, Parks and Recreation Department 2003).

County General Plan

R-PR 3[2]. The County's regional park system should:

a. utilize the county's finest natural resources in meeting park and open space needs; and

b. provide a balance of types of regional parks with a balanced geographical distribution.

R-RC 37. Lands near creeks, streams, and freshwater marshes shall be considered to be in a protected buffer area, consisting of the following:

1. 150 feet from the top bank on both sides where the creek or stream is predominantly in its natural state;

[2] Policy labels are from the County or city document in which the policy is identified.

2. 100 feet from the top bank on both sides of the waterway where the creek or stream has had major alterations; and

3. In the case that neither (1) nor (2) are applicable, an area sufficient to protect the stream environment from adverse impacts of adjacent development, including impacts upon habitat, from sedimentation, biochemical, thermal and aesthetic impacts.

R-RC 38. Within the aforementioned buffer areas, the following restrictions and requirements shall apply to public projects, residential subdivisions, and other private non-residential development:

a. No building, structure or parking lots are allowed, exceptions being those minor structures required as part of flood control projects.

b. No despoiling or polluting actions shall be allowed, including grubbing, clearing, unrestricted grazing, tree cutting, grading, or debris or organic waste disposal, except for actions such as those necessary for fire suppression, maintenance of flood control channels, or removal of dead or diseased vegetation, so long as it will not adversely impact habitat value.

c. Endangered plant and animal species shall be protected within the area.

R-RC 47. Impacts from new development on woodland habitats should be minimized by encouraging:

a. clustering of development to avoid critical habitat areas, where clustering is permitted;

b. inclusion of important habitat within open space areas for project requiring open space dedication;

c. siting and design of roads, utility corridors and other infrastructure to avoid fragmentation of habitat; and

d. acquisition or avoidance of critical habitat areas.

R-RC 95. The scenic and aesthetic qualities of both the natural and built environments should be preserved and enhanced for their importance to the overall quality of life for Santa Clara County.

R-RC 96. The general approach to scenic resource preservation for the rural unincorporated areas consists of the following strategies:

1. Minimize scenic impacts in rural areas through control of allowable development densities.

2. Limit development impacts on highly significant scenic resources, such as, ridgelines, prominent hillsides, streams, transportation corridors and county entranceways.

R-LU 25. Non-residential land uses allowed in ‘Hillsides’ areas shall be of a generally low density or low intensity nature, depending on the use, as is consistent with the basic intent of the Hillsides designation to preserve the resources and rural character of the land.

R-LU 59. Residential development may be clustered, provided that the open space portions of the development are protected as permanent open space.

R-LU 20. Proposed cluster residential developments shall adhere to the following:

2. Open Space: it is mandatory that no less than 90% of the land area shall be preserved permanently as open space through dedication of an open space or conservation easement precluding any future development:

a. those portions of the land permanently preserved as open space shall be configured as large, contiguous and usable areas;

b. the open space may be dedicated through easements over portions of individually-owned parcels or may be configured as separate parcels owned in common or individually;

c. the open space area shall be privately controlled and not accessible to the public unless the area is deeded to a public agency or entity willing to undertake responsibilities of ownership, maintenance, and public access [designated trail corridors may traverse such areas if proposed as part of the Regional Parks, Trails, and Scenic Highways Plan]; and

d. land uses allowed within the area dedicated as permanent open space shall be limited to agricultural or other limited resource-related uses, and to non-commercial recreational facilities of an ancillary nature to the cluster residential development and for use by residents only.

County Parks Strategic Plan

Strategy #1.1.1: Acquire New Parks – New regional park acquisitions should be considered on lands that:

- expand the boundaries of existing parks or connect these areas;
- provide parks in underserved areas; and
- conserve representative diverse natural landscapes and historic resources of the County.

Strategy #4.1.1: A regional parks and trails system should be designed that is consistent with the County General Plan and other County policies associated with protecting and enhancing natural resources, including but not limited to: rich biological habitat areas including wetlands, baylands, and riparian areas; areas of serpentine geology; natural, cultural, and historic areas; and other significant natural features.

Strategy #4.1.2: Park and trail use levels and a monitoring system should be developed to ensure recreation and biological resources are balanced in a manner that protects resource qualities.

Strategy #4.1.3: Recreational uses and facilities should be planned and located on suitable lands to avoid impacts to rich biological habitat areas.

Strategy #4.1.4: When park development might impact natural areas, appropriate mitigation to enhance/improve the habitat values should be employed.

Strategy #4.3.1: Natural habitat areas in the County Parks should be enhanced through active stewardship programs and using best management practices (BMPs) based on the most current, reliable scientific information available.

San Martin Planning Area

San Martin is an approximately 12.3-square-mile unincorporated community located between the sphere of influence lines of the cities of Morgan Hill and Gilroy. San Martin is a rural residential community built around a village dating back to the early 1900s. This community, surrounded by farms, orchards and ranchlands, retains a pastoral rural character (County of Santa Clara 1994). As of the 2000 census, San Martin had a total population of 4,230 (U.S. Census Bureau 2006).

The Santa Clara County General Plan anticipates that this area will remain rural residential. However, there is concern within the San Martin community that local land use control will be diminished as housing pressure for the growing County population increases.

Relevant General Plan Policies for San Martin

R-LU 114. San Martin should be viewed as a distinct entity, containing unique rural characteristics. Care should be taken to prevent premature commitment of land for uses that would restrict future options for the community.

Santa Clara Valley Water District

SCVWD is the primary water resource agency for Santa Clara County (Santa Clara Valley Water District 2006), providing water to the residents and businesses of Santa Clara County as a water wholesaler and managing local groundwater. SCVWD is also a flood-protection agency and is the main steward for urban streams and creeks in the County and its underground aquifers. Stewardship activities include creek restoration and wildlife habitat projects, pollution prevention, and a commitment to natural flood protection (Santa Clara Valley Water District 2006).

The mission of SCVWD is to maintain “a healthy, safe, and enhanced quality of living in Santa Clara County through watershed stewardship and comprehensive management of water resources in a practical, cost-effective, and environmentally sensitive manner” (Santa Clara Valley Water District 2006). This mission reflects the current approach to water management utilized by SCVWD that balances water supply, flood protection, and environmental sensitivity. SCVWD has developed several programs including the Stream Maintenance Program and Watershed Stewardship Program that also reflect this management approach.

There are 768 miles of creeks with watersheds greater than 320 acres. SCVWD owns 178 miles or 26% of these creeks; other public agencies own 87 miles or 19% of the creeks; private owners own 400 miles or 52% of the creeks and the remaining 46 miles or 6% of the creeks are owned by unidentified entities. SCVWD holds easements on approximately 100 miles of creeks which are owned in fee title by others.

SCVWD is a conjunctive-use agency. Conjunctive use is a system of water supply management that utilizes both aboveground (reservoir) and below-ground (aquifer) storage facilities to ensure water supply reliability. Conjunctive use typically entails reservoir or pipeline releases to groundwater recharge ponds—which are either on-channel (i.e., in a natural stream bed) or off-channel—where water percolates into an aquifer and is stored for later extraction. Water stored this way may be rainfall collected in the reservoirs in the County, or reclaimed water. In addition to local water resources, SCVWD also imports water from the State Water Project and the Central Valley Pipeline. SCVWD's conjunctive use strategy involves managing the available water supplies and the water supply system to:

- meet on-going demand for water from a variety of local and imported sources;
- fill reservoirs in the wet season; and
- transfer water from reservoirs to underground storage in the dry season, making room in the reservoirs for the next wet season.

In order to ensure water will always be available to meet flow requirements and water supply needs, SCVWD utilizes a network of reservoirs, pipelines, and canals to transfer water into the county and also between watersheds within the study area. Imported water (State Water Project and Central Valley Project) enters the county via pipelines and is either deposited in reservoirs, recharge ponds, canals, or into local stream channels. Water transfers between reservoirs are facilitated by pipelines and canals. The canals were built to transport water between creek systems, from creeks to percolation ponds, and to generally support the management of water supply resources in the Valley. They also assist with stormwater management, helping to drain high flows. Water extracted from the system for use is directed to water treatment plants via pipelines and pumping stations.

Operating such a system requires detailed timing of flow releases from reservoirs, management of imported water, operation of in-channel facilities and canals, operation of pumping stations, and maintenance of the infrastructure required to support the system. It also requires maintenance of a complex system of water supply pipelines, canals, dams, reservoirs, pumping stations, diversions, drop structures, streamflow gauges, fish ladders, fish screens, water treatment plants, canals, and associated facilities. An overview of SCVWD water conveyance, treatment, and distribution system is shown in **Figure 2-1**.

SCVWD owns and operates ten reservoirs, with a main function of providing water supply and a secondary function of providing flood control. The reservoirs also serve a tertiary need for recreation. Only one reservoir, Chesbro Reservoir, was designed as a multipurpose facility with a dedicated flood-storage level and an outlet that can significantly reduce storage in a short time (Santa Clara Valley Water District 2005). Eight of the ten reservoirs are located in the study area: Vasona, Guadalupe, Almaden, Calero, Anderson, Coyote, Chesbro, and Uvas reservoirs (see **Figure 1-2** for a study area map that includes reservoirs). The remaining two reservoirs, Stevens Creek and Lexington Reservoirs, are outside the study area.

SCVWD is responsible for inspection; operations; and maintenance, repair, and replacement of facilities on properties it owns or for which it holds an easement. SCVWD is also responsible for operations and maintenance of the San Felipe Division facilities that are owned by the Bureau of Reclamation. These properties and easements account for approximately 35% of the total creek and canal length in the county, including the Coyote, Almaden-Calero, and Coyote-Alamitos canals and the Coyote canal extension.

Factors Affecting Conjunctive Use Operations

Factors influencing how water supply is managed vary over time and by site, depending on the time of year, availability of water supply from outside sources, SCVWD's legally defined rights to water supplies from each source, conditions at each site, the local demand for water, and the condition and operability of SCVWD facilities. Factors that affect reservoir operation include water rights, water contracts, safety, recharge and fish flows, facility maintenance, climactic variation, and the California Division of Safety of Dams (DSOD) interim storage or other restrictions. Each of these factors is described below. Conjunctive use operations are affected by the factors described below.

Water Rights

SCVWD holds water right licenses and a permit from the State Water Resources Control Board to appropriate a specified maximum volume of water for storage in any given year. In terms of on-the-ground operations, the right to appropriate water at a reservoir is effectively the right to divert or capture this water behind the dam and store it to provide for some beneficial use. These diversions are generally limited to the wet season, generally defined as October 1 through April 30. However the authorized diversion period for each water right varies. During periods when SCVWD does not have authorization to divert at the reservoirs (generally May 1 through October 30), SCVWD must release flow at the rate of inflow to the reservoir. For example, if inflow to a reservoir outside of the authorized diversion period is two cubic feet per second (cfs), then SCVWD must release at least 2 cfs, and it cannot divert this flow downstream. However, if SCVWD releases water from storage, that is water in excess of the natural inflow, SCVWD may release that water for recharge, either in-stream or by diversion to off-stream facilities, or release the water for other SCVWD purposes.

SCVWD has water rights to divert natural inflow at the site of its off-channel recharge facilities. These rights specify a total annual volume that may be diverted and a diversion period. In addition to limitations imposed on SCVWD's diversions to storage imposed by its water rights and the design of diversion dams, diversions are also governed by the capacity of fish screens, CDFG bypass flow requirements, and placement of flashboards.

Water Contracts

SCVWD has two primary water supply contracts: one with DWR for 100,000 acre-feet from the State Water Project and one with the Bureau of Reclamation for 152,500 acre-feet from the Central Valley Project. The combined water supply contracts provide a total of 252,500 acre-feet to SCVWD annually. Both contract supplies are subject to annual shortages, and both provide access in wet years to additional temporary deliveries. To improve long-term reliability, SCVWD also has a contract with Semitropic Water Storage District (Semitropic) for 350,000 acre-feet of banking capacity, and enters into a variety of imported water management contracts, including annual, short-term, and long-term water exchange, transfer, sale, conveyance, and management agreements with various parties. New contracts and contract renewals and amendments are for the purpose of improved reliability and, when combined with the allocation under each of the Central Valley Project and State Water Project contracts, would not exceed a maximum annual delivery of 252,500 acre-feet to Santa Clara County over the course of the permit term of this Plan. Because the amount of imported water is not anticipated to increase over existing planned water imports, and population growth according to existing general plans is covered (described in Section 2.3.2 *Urban Development*), this Plan covers any direct, indirect, cumulative, or growth-inducing effects of delivering and utilizing imported water under existing and future contracts if the amounts and points of delivery remain as projected.

Delivery of imported water by the Department of Water Resources and the Bureau of Reclamation to SCVWD's service area and contract renewal between SCVWD and the Bureau of Reclamation is not a covered activity under this Plan. However, this Plan does cover the reconstruction of facilities located within the permit area (described below in Section 2.3.3 *In-Stream Capital Projects* and Section 2.3.5 *Rural Capital Projects*) required to transport imported water throughout the study area (e.g., reservoirs, canals, groundwater recharge ponds), and the operation and maintenance of facilities located within the permit area (described in this section and in Section 2.3.6 *Rural Operations and Maintenance*) required to manage water supply (e.g., Dam Maintenance Program, reservoir operations, recharge operations, Pipeline Maintenance Program).

Safety

Reservoirs also function to reduce the potential for very large storms to cause flooding, and operators may slow down the rate of reservoir filling or make post-storm releases to avoid having a full reservoir too early in the wet season. To the extent that it is feasible, SCVWD operates to ensure that there is appropriate "space" in the reservoir to store anticipated storm flows and monitors weather on an on-going basis; releases may be made prior to a storm if needed to ensure adequate storage space. Following a storm, SCVWD may make additional releases to restore needed space for subsequent storm flows. As a result, reservoir operations in the wet season are not characterized by a steady increase in storage, but by episodes of storage and release of water, with a general trend towards increasing the volume of water stored as the wet season progresses.

Fish Flows

SCVWD maintains flow in the channels using local and imported water supplies to maintain fish and wildlife habitat below the dams. In order to benefit the fisheries within the watersheds in which SCVWD's conjunctive use water supply operations take place, SCVWD may re-operate its conjunctive use operations (i.e., alter how conjunctive use operations are currently managed in order to further enhance fish habitat). This re-operation is described in this chapter under the *Proposed Three Creeks HCP Conservation Program Operations and Maintenance Actions* and *Proposed Operating Rules for Water Supply Facilities in the Uvas and Llagas Watersheds*. Such re-operation may alter the existing pattern of storage and recharge which may result in take of covered amphibians and reptiles.

SCVWD will not re-operate its conjunctive use operations until it receives authorization from NMFS and CDFG. In the proposed Three Creeks HCP study area this will be accomplished through the Three Creeks HCP. In the Uvas and Llagas watersheds, this may be accomplished through an informal consultation with NMFS and CDFG, a new HCP process, or through formal consultation with NMFS pursuant to Section 7 of the ESA.

Facility Maintenance

Facility maintenance may require SCVWD to reduce reservoir releases temporarily. For example, recharge basins may require cleaning, and SCVWD would reduce diversions accordingly. At the dam, valves may need routine calibration and maintenance, resulting in short-term reductions in releases.

Climate Variation

Groundwater recharge is possible in all seasons because of the intermittent nature of precipitation and inflow to the study area watersheds. For example, there are many times in a typical wet season when natural flow is minimal and SCVWD makes releases from reservoirs and other facilities to maintain a wetted channel and to provide for off-channel recharge. In addition to intra-annual variation in conditions, conjunctive use operations also respond to year-to-year conditions. In dry years, initial wet-season storage may be quite low, resulting in an initial period of limited releases as storage reaches the baseline values for seasonal storage. When this occurs, a more normal pattern of storage and release is implemented.

Flood Management

In addition, the SCVWD will continue to operate its reservoirs to provide for safe conditions for downstream communities. This involves managing reservoir storage to ensure that there is adequate capacity to contain high levels of projected inflow during storm events. Reservoirs capture flood flows from the upper watershed and protect downstream reaches from overbanking. When a large storm is predicted, reservoir storage is drawn down to a level that allows room to capture upstream flood flows. SCVWD developed probability flood curves which are used to determine how much flood storage room should be freed up. Prior to a major storm, SCVWD may increase releases to provide for storage adequate to prevent flooding, followed by a shift to reduce releases when the threat of flooding has passed.

Water Resources Protection Ordinance

In October 2006, SCVWD enacted the Water Resources Protection Ordinance. This ordinance established the regulations by which, beginning on February 28, 2007, SCVWD issues permits for modifications, entry, use, or access to SCVWD facilities with the approval and enactment of ordinance O6-1, and where SCVWD has either a fee title or easement property right. This ordinance was developed and enacted to codify the Water Resources Protection Ordinance: Guidelines and Standards for Land Use Near Streams developed by the Santa Clara Valley Water Resources Protection Collaborative[3] (Collaborative).

The Collaborative was formed in 2003 to address the needs of flood management, drinking water quality and quantity, surface and groundwater quality and quantity, and habitat protection and enhancement throughout the county (Santa Clara Valley Water District 2006). With the enactment of these measures, SCVWD, the cities, and the County are better equipped to protect the integrity of streams in the context of the goals of cleaner, healthier, and more sustainable water resources.

Other agencies do not comply directly with ordinance O6-1, but instead can adopt the guidelines of O6-1 or determine that existing zoning code and/or policies fulfill the guidelines. San José and the County approved resolutions, finding that their existing codes comply with the guidelines, Morgan Hill adopted the guidelines, and Gilroy added a new Water Resources Protection chapter to its zoning code, thereby incorporating the guidelines. An encroachment permit is required for all projects that modify, enter, use, or access SCVWD lands and/or easements. It is through the administration and issuance of the encroachment permit that the guidelines and standard are enforced and tracked.

The issuance of the encroachment permit is subject to an environmental assessment and must be found to be in compliance with CEQA. In addition, a number of findings must be made, including, but not limited to, that the proposed modifications will not impede, restrict, slow down, pollute, change the direction of water flow, catch or collect debris carried by the water, and banks will not be damaged, weaken, eroded, increase siltation, be reduced in their effectiveness to withhold storm and flood waters.

[3] The Santa Clara Valley Water Resources Protection Collaborative is formed by several member agencies and private community members including SCVWD, the County of Santa Clara, all of the cities and towns within Santa Clara County.

Santa Clara Valley Transportation Authority

The VTA is an independent special district responsible for bus and light rail operations, congestion management, specific highway improvement projects, and Countywide transportation planning. As such, VTA is both a transit provider and a multi-modal transportation planning organization involved with transit, highways and roadways, bikeways, and pedestrian facilities (Santa Clara Valley Transportation Authority 2006).

The mission of VTA is to provide “sustainable, accessible, community-focused, transportation options that are innovative, environmentally responsible, and promote the vitality of our region” (Santa Clara Valley Transportation Authority 2008).

The responsibilities of VTA include transit service, transit planning, highway planning, commuter train service (Caltrain), the Congestion Management Program, and regional transit partnerships. VTA is primarily a funding agency for local transportation and related projects such as bikeways.

VTA often partners or works in conjunction with other agencies and jurisdictions. A manifestation of this is apparent in the Valley Transportation Plan 2035 (VTP 2035) recently completed by VTA (Santa Clara Valley Transportation Authority 2009). This document contains hundreds of projects submitted to VTA by cities in Santa Clara County and by the County. Although these projects are spearheaded by the jurisdiction, the VTP 2035 helps the jurisdictions present the projects as part of a long-range planning package, as well as seek funding sources for the projects. Almost all projects in the VTP 2035 are projects that VTA will implement with other local or state agency partners.

2.2.2 Land Use Categories

Understanding the future land use in the Plan study area is an important step in developing the impact analysis for covered activities in Chapter 4. The adopted general plans for the cities of Gilroy, Morgan Hill and San José and Santa Clara County were used to identify future extent and location of urban and rural development in the study area that could be covered by the Plan. General plan land use designations and discussions with the participating jurisdictions were used to refine the land use assumptions for the areas that are designated to become urban.

General plan land-use designations vary across jurisdictions and are generally in more categories than necessary for the Plan, so they need to be simplified and standardized. The process by which a land use map was developed and how land use categories for the Plan were assigned is described below.

Methodology for Developing the Land Use Categories Map

Land-use designations for Santa Clara County and Cities of Gilroy, Morgan Hill, and San José were used to develop a single land use map for the Plan. Future land uses were assumed to be consistent with the general plans of the County (2001), City of Gilroy (2002a, 2002b), City of Morgan Hill (2006), City of San José (2006a, 2011), and the City of Gilroy Hecker Pass Specific Plan (City of Gilroy 2005b). The County of Santa Clara general plan projects future land use to 2010, the Gilroy general plan projects future land use to 2020, the Morgan Hill general plan includes growth and development management measures that extend to 2025, and the San José general plan projects land use to 2040. Using these projections for this Plan with a significantly longer time horizon is regarded as appropriate given the strength of each jurisdiction's commitment to constraining future growth within established urban growth boundaries (see discussion above under *Existing Conditions*).

Over 80 land-use designations from the four jurisdictions were aggregated into the following six categories.

- Urban Development.
- Rural Residential.
- Ranchland/Woodland.
- Agriculture.
- Urban Parks and Open Space.
- Rural Parks and Open Space.

Development of these six categories was guided by the nature of the covered activities within each land use category and their relative impact on biological resources. For example, the many urban land use categories (e.g., residential, commercial, industrial) were combined into a single land use category for this Plan because they all result in similar effects on biological resources. **Table 2-1** shows general plan land uses and the Plan land use categories to which they were converted.

Most of the jurisdictional land-use designations translate in their entirety to a Plan land use category. One exception, however, is parks and open space designations in each city. Some city parks are large, located on the urban fringe, and may function well as habitat for covered species or as a part of a movement corridor. In these cases, the park was designated as Rural Parks and Open Space. Therefore, city designations for parks and open space will be individually considered and certain sites will be categorized as Rural Parks and Open Space.

Plan Land Use Categories

Figure 2-2 shows the Plan land use categories in the study area. This map depicts development land use designations that include both developed and undeveloped areas (for actual land *cover*, see Chapter 3).

The Urban Development land use category includes residential densities greater than 1 dwelling unit per 2.5 acres, as well as all industrial, commercial, institutional, public facilities, public/quasi-public, and major educational facilities land-use designations. The study area is 519,506 acres of which 100,143 acres (19%) are categorized as Urban Development.

The Rural Residential category includes low-density residential development density of 1 dwelling unit per 2.6 to 20 acres. Rural residential lands tend to be located in the unincorporated areas of the County; however, each of the three cities covered by the Plan also maintain land use densities that correspond to the Plan's Rural Residential category. The Rural Residential land use category comprises 13,141 acres (3%) of the study area.

The Ranchland/Woodland category includes rural lands with a development density of 1 dwelling unit per 20.1 to 160 acres. This category is comprised of all lands not otherwise designated. It includes open lands common in the western slopes of the Diablo Range as well as the woodlands common to the eastern slopes of the Santa Cruz Mountains. According to the County general plan, ranchlands are defined as "lands predominantly used as ranches in rural unincorporated areas of the County, remote from urbanized areas and generally less accessible than other mountain lands." The Ranchland/Woodland land use category comprises 253,098 acres (49%) of the study area.

County lands designated as Agriculture may be used for: "agriculture and ancillary uses; uses necessary to directly support local agriculture; and other uses compatible with agriculture which clearly enhance the long term viability of local agriculture and agricultural lands" (County of Santa Clara 1994). In addition to the County, the City of Gilroy supports some agriculture in the Hecker Pass Special Use District and Specific Plan. Agriculture in this area includes low intensity crops such as vineyards, orchards, and some row crops (City of Gilroy 2005b). For this Plan, land uses identified by the Hecker Pass Specific Plan are incorporated with land-use designations of the City of Gilroy. The Agriculture land use category comprises 23,852 acres (5%) of the study area.

The Plan category of Urban Parks and Open Space includes lands designated by cities or the County for parks and recreation, and for open space that is surrounded by urban development or is itself highly developed or landscaped. These sites are all located within incorporated city limits and are unlikely to be used by any of the species covered by this Plan except along some rivers and creeks. The Urban Parks and Open Space land use category comprises 7,289 acres (1%) of the study area.

The Plan Rural Parks and Open Space category encompasses parks and open space in rural areas, including larger parcels of land located on the urban fringe, and indicates that the landscape may be used by covered species. This category includes federal land; local, state, and regional parks; private lands that are protected with conservation easements or dedicated development rights, or that are used in a manner that would allow use by covered species (including large golf courses on the urban fringe); and public watershed lands. Some of the sites categorized as Rural Parks and Open Space are expected to be important components of the Plan conservation strategy. The Rural Parks and Open Space land use category comprises 121,072 acres (23%) of the study area.

2.2.3 Planning Limits of Urban Growth

Urban development covered by the Plan includes the growth anticipated by approved or drafted general plans at the time of permit issuance. Identifying the extent of expected urbanization within the Plan study area, or the "planning limit of urban growth," informs the impact analysis and identifies the extent of take coverage for urban development needed under the Plan.

One important factor in identifying the planning limit of urban growth is defining where road projects enter and exit the urbanized area. Road projects outside urban areas are expected to have greater impacts on some covered species than road projects within urban areas, so they may be treated differently by the Plan. The anticipated planning limits of urban growth are discussed for each city under the Existing Conditions section above, are shown in **Figure 2-2**, and are summarized below.

- Gilroy: General Plan Boundary (City of Gilroy 2002a).
- Morgan Hill: Urban Limit Line (adopted April 2006).
- San José: Urban Growth Boundary, also known as the "Greenline" (adopted by voters in 2000).

There are three exceptions to the assumption of full urban development within the planning limits of urban growth over the course of the permit term.

1. The City of San José Coyote Valley Urban Reserve and the South Almaden Valley Urban Reserve.
2. The City of Morgan Hill Southeast Quadrant.
3. The City of Gilroy Hecker Pass Specific Plan (City of Gilroy 2005b).

These three areas are assumed to be developed consistent with rural development land uses and not urban land uses.

The County does not permit urban growth in its jurisdictions except within urban "pockets" of unincorporated lands that occur in small patches within the three cities. The County has identified a general plan Strategy of promoting eventual annexation of these urban pockets to the city in which the pocket is located (County of Santa Clara 1994). Therefore, it is anticipated that all County pockets currently inside a city's planning limit of urban growth will be incorporated into a city over the course of the permit term of the Plan. As such, a planning limit of urban growth is not defined for the County in this Plan.

2.2.4 Existing Open Space and Parkland

Dating back to the 1970s, the County of Santa Clara, SCVWD, and the cities of Gilroy, Morgan Hill, and San José have had a close connection to the natural landscapes of the Santa Clara Valley and an awareness of the importance of protecting open space. Of the 519,506-acre study area, 151,727 acres (29%) are currently protected as open space of some kind. These areas range from urban parks to County and state parks of varying size. The following section provides an overview of existing open space agencies with holdings in the study area and the major open space units that they operate. Significant open space units in the study area which help support the Plan's conservation strategy are described in **Table 2-2** and shown in **Figure 2-3**.

United States Bureau of Land Management

The Bureau of Land Management owns several parcels of land in Santa Clara County. Two of those parcels are located within the study area just north of Middle Fork of Coyote Creek, north of Henry W. Coe State Park. The Bureau of Land Management has transferred large parcels of land to California Department of Parks and Recreation (State Parks) to become part of Henry W. Coe State Park. The remaining parcels totaling approximately 1,025 acres are still under the ownership of the Bureau of Land Management, but may be transferred to the park in the future.

California Department of Parks and Recreation

State Parks owns two large parks that occur, in part, in the study area: Henry W. Coe State Park and Pacheco State Park. State Parks also jointly owns Martial Cottle Park with the County of Santa Clara. Henry W. Coe State Park and Pacheco State Park are discussed below. Martial Cottle Park is discussed under *County of Santa Clara, Parks and Recreation Department*.

Henry W. Coe State Park

Henry W. Coe State Park is the largest state park in northern California at 85,843 acres, 58,642 acres of which (68%) are within the study area. The remaining 27,201 acres of the park are in Santa Clara and Stanislaus Counties. Much of the park was originally donated by Sada Coe Robinson to Santa Clara County in 1953, when it became Henry Willard Coe County Park. In 1958, the park was added to the state park system. The park's original size was approximately 13,000 acres. Since the 1980s, the park has expanded considerably through the purchase of adjacent properties on all sides. The park is still growing.

Elevations in this rugged park range from approximately 1,000 feet to 3,560 feet. The park has a diverse mix of habitat types including grassland, oak woodland, ponderosa pine forest, mixed chaparral, riparian woodland, and over 100 ponds. The park also supports two large man-made lakes, Mississippi Lake and Coit Lake, as well as the headwaters of Coyote Creek and several miles of Pacheco and Orestimba creeks. The 23,300-acre Orestimba Wilderness, a state-designated wilderness area that accounts for approximately 27% of the total acreage of the park, is entirely within Stanislaus County, adjacent to the study area. The park is open year-round for hikers, mountain bikers, backpackers, equestrians, picnickers, and photographers on over 100 miles of trails and roads. Access to the park by car is extremely limited, with only four entrances and paved roads that stop at the margins of the park. The main entrance and park headquarters is approximately 13 miles east of U.S. 101 northeast of Gilroy and accessed via the Dunne Avenue exit from U.S. 101 in Morgan Hill (California Department of Parks and Recreation 2004).

Natural resources management at Henry W. Coe State Park is focused on high-priority threats, such as an overabundance of wild pigs, which can cause considerable damage to wetland and grassland areas. To address this threat, park managers contract with trained hunters to help reduce wild pig populations. Yellow star-thistle and other invasive weeds also present a threat to the native grasslands in the park. Grassland areas are managed through the use of small prescribed burns which reduce the spread of invasive plant species. An important unmet need in park management is maintenance of existing but unused stock ponds that provide important habitat for California red-legged frog and California tiger salamander (A. Palkovic pers. comm.). There is no livestock grazing in the park. Wildfire management is also an issue for the park. In 2007, the Lick fire burned 47,760 acres and resulted in a temporary the closure of affected areas in the park. Currently there are fewer than three full-time staff devoted to this park. Staff and budget limitations severely constrain State Park's ability to conduct extensive habitat and species management in this large park.

Pacheco State Park

Pacheco State Park came into existence through a donation in 1992 by Paula Fatjo, a direct descendant of Francisco Pacheco for whom the Pacheco Pass is named. Visitors on the park's trails enjoy views of the San Luis Reservoir and the San Joaquin Valley to the east and views of the Santa Clara Valley to the west. The park supports rolling hills of mostly grassland and oak woodland habitats. Approximately 734 acres of the 6,921-acre park are within the study area. The remaining 6,187 acres are in adjacent Merced County. The western 2,600 acres of the park (including the portion in Santa Clara County) are open to the public (California Department of Parks and Recreation 2004).

California Department of Fish and Game

The CDFG owns the Cañada de los Osos Ecological Area, formerly the Stevenson Ranch, located on Jamieson Road, about ten miles east of Gilroy. The CDFG purchased the 4,400-acre ranch in 2001 with the assistance of The Nature Conservancy. Two hundred acres of the property were sold to the State Parks as a trailhead into Henry W. Coe State Park. The remaining 4,200 acres are managed by the CDFG in cooperation with the California Deer Association for youth outdoor education programs and the improvement of wildlife habitat on the property. A grazing management plan has been developed for this site, although the plan has not been implemented.

County of Santa Clara, Parks and Recreation Department

The mission of County Parks is to provide, protect and preserve regional parklands for the enjoyment, education and inspiration of this and future generations (County of Santa Clara, Parks and Recreation Department 2003). Since its inception in 1956, County Parks' park system has grown to encompass approximately 45,000[4] acres in 28 park units that provide a variety of urban and rural recreational amenities. For more than four decades, County Parks has focused on purchasing and developing a network of regional parks and trails along the hillsides adjacent to the urban fringe and along the creeks that pass through the urban service area. This "necklace of parks" vision was put into place in the early 1960s and has guided park acquisition and development ever since (County of Santa Clara, Parks and Recreation Department 2003). County Parks balances access and recreation with resource protection. In addition to providing recreation opportunities in the County, County Parks conducts resource preservation, protection, conservation, enhancement, and restoration.

Strategic Plan

With the goal of accommodating the growing outdoor recreation needs of an increasing urban population, the County Parks Strategic Plan (County of Santa Clara, Parks and Recreation Department 2003) lays out a vision that will allow the system to continue to meet the needs of the County's residents. The vision of the Plan is captured in the following statement.

> We create a growing and diverse system of regional parks, trails, and open spaces of Countywide significance that connects people with the natural environment, offers visitor experiences that renew the human spirit, and balances recreation opportunities with resource protection (County of Santa Clara, Parks and Recreation Department 2003).

[4] While County Parks manages all 45,000 acres for recreation, approximately 5,000 of the 45,000 acres are owned by SCVWD.

The County Parks Strategic Plan focuses on the balance of recreation and natural resource protection, guiding the improvement and expansion of the County park and countywide trail system to meet the growing demand for high-quality recreational opportunities in Santa Clara County while also supporting and protecting local natural resources (County of Santa Clara, Parks and Recreation Department 2003).

Countywide Trails Master Plan

The Santa Clara County Countywide Trails Master Plan Update, an update to the 1980 County General Plan Trails element, was completed in November 1995 by the County of Santa Clara, Parks and Recreation Department. The Board of Supervisors adopted the updated trail policies and trails map as an amendment to the County General Plan. This update provides a vision for a network of contiguous trails that connects County parks, open space areas and other trails systems with northern and southern urbanized areas. As part of the update, the countywide trails policies and design guidelines were updated and developed to guide continued planning, define a process for implementing trails and coordinating with private property owners, establishing priorities, mitigating environmental impacts, and directing trail use, design, operations, and management (County of Santa Clara, Parks and Recreation Department 1995).

Natural Resources Management

County Parks maintains a small but active natural resources management program guided by the County Parks Strategic Plan and natural resources management guidelines (County of Santa Clara, Parks and Recreation Department 2004). The Natural Resources Management Program is comprised of four full-time staff for the entire County park system. Management or restoration projects are often implemented by natural resource staff, park maintenance staff, park rangers or contractors.

County Parks is in the process of developing comprehensive natural resource management plans for all of its park units and grazing management plans for some of its park units. The Ed R. Levin, Joseph D. Grant, and Coyote Lake-Harvey Bear Ranch County parks were the first County parks for which County Parks developed formal natural resource management plans in the study area. The Coyote Creek Parkway Integrated Master Plan (a combined natural resource management plan and master plan) was adopted in March 2007 (County of Santa Clara, Parks and Recreation Department 2006a). Interim natural resource management plans have been completed for most of the parks.

The current focus of the natural resources management program is conducting system-wide assessments of resources within the parks to identify and prioritize management actions. Site-specific management projects have been limited due to funding and staffing constraints and the need for management plans. Recent projects and programs have included riparian enhancement, invasive weed control, oak woodland enhancement programs, vegetation management projects and programs, grassland enhancements, wildlife enhancements throughout the park system, livestock grazing programs, wetland restoration, and prescribed burns. Many of these actions have taken place at Joseph D. Grant County Park.

In 2004 a Grazing Management Plan was completed for Calero/Canada del Oro to address Bay checkerspot butterfly mitigation and habitat enhancement. In 2011 County Parks completed a Grazing Management Plan for Santa Teresa County Park to address management of annual grasslands and oak woodlands for the benefit of native species, management of wildfire risks, control of non-native plant species, while addressing continuing public access to these special areas. This Grazing Management Plan is in response to the need to manage serpentine grassland habitats as well as the implementation of the USFWS's *Recovery Plan for Serpentine Species of the San Francisco Bay Area* (U.S. Fish and Wildlife Service 1998). Through federal grant funding assistance from the USFWS and the Bureau of Reclamation, County Parks will be implementing the goals of the Grazing Management Plan to return cattle to the park in order to manage the serpentine grassland habitats.

Major County Parks

Several large regional parks within the study area are owned and/or managed by County Parks. Collectively, these parks are representative of the diverse resources available in Santa Clara County and support a variety of recreational interests including hiking, mountain bicycling, horseback riding, picnicking, golf, archery, hang gliding, model aircraft areas, dog parks, boating, water skiing, fishing, camping, velodrome races, and natural and cultural interpretation. A brief discussion of County parks that may contribute to the Plan conservation strategy is included below and summarized in **Table 2-2** (also see **Figure 2-3** for map of open space in the study area, including County parks).

Almaden Quicksilver County Park

Almaden Quicksilver County Park is located on the western border of the study area, surrounding much of Guadalupe and Almaden Reservoirs. The park was historically used for mining activities and was once home to more than 1,800 miners and their families. The park encompasses 4,152 acres, occupying a majority of Capitancillos Ridge. The park is known for its early spring wildflowers and history surrounding the late 19th century mining era.

The park provides over 34 miles of hiking trails, including 23 miles of equestrian trails and 10 miles of bike trails. All trails in the park are open to hikers with pets to walk their dogs on leash (County of Santa Clara, Parks and Recreation Department 2006b).

Anderson Lake County Park

Anderson Lake County Park is located in the foothills of the Diablo Range east of Morgan Hill and almost entirely (except in the northeast) surrounds Anderson Reservoir, the largest reservoir in Santa Clara County. The 3,144-acre park incorporates other parks including segments of the Coyote Creek Parkway multiple use trails, the historic Jackson Ranch, the Moses L. Rosendin area, and the Burnett area (County of Santa Clara, Parks and Recreation Department 2006b).

Calero County Park

Calero County Park is located in the eastern foothills of the Santa Cruz Mountains, south San José. The approximately 4,455-acre park offers picnicking, boating and fishing on Calero Reservoir and 18.6 miles of trails in the adjoining oak woodlands. The park contains a trails staging area at the Park office near McKean Road. Additional access is available from the Santa Clara County Open Space Authority (Open Space Authority) Rancho Canada del Oro staging area on Casa Loma Road. Certain uses, such as equestrian group camping, horse and cart activities and special events are by permit only (County of Santa Clara, Parks and Recreation Department 2012). Portions of this park historically have been grazed (J. Mark pers. comm.)

County Parks is developing a Trails Master Plan for Calero County Park to incorporate the 966-acre Rancho San Vicente property acquired in November 2009 into the park (this parcel is also expected to be enrolled in the Habitat Plan Reserve System; see Chapter 5 for interim conservation actions). The Trails Master Plan will also consider expanding the types of trail uses allowed in the park in accordance with provisions of the *Santa Clara County Parks and Recreation System: Strategic Plan* which states that the purpose of a park-specific Trails Master Plan is “to identify opportunities to increase multiple-use trails and to ensure consistency with the Countywide Trails Master Plan and Strategic Plan” (County of Santa Clara, Parks and Recreation Department 2003).

Portions of this park have been grazed in the past (D. Rocha pers. comm.). A Grazing Management Plan was completed for the Canada del Oro property of Calero County Park in 2004 (County of Santa Clara, Parks and Recreation Department 2011; Rana Creek Habitat Restoration 2004). Infrastructure to support implementation of the Grazing Plan is under development. The Rancho San Vicente property of Calero is currently grazed under a managed grazing program through a grazing license with a private operator (D. Rocha pers. comm.).

Coyote Creek Parkway

Coyote Creek Parkway is a 1,694-acre park that meanders along Coyote Creek for 15 miles, bridging the gap between rural and urban parks along the valley floor within the study area. Coyote Creek Parkway ends at Hellyer County Park to the north and Anderson Lake County Park to the south. The Coyote Creek Trail features a 15-mile, 10-foot wide multi-use paved trail between Hellyer County Park and Anderson Lake County Park. The trail is identified in the Countywide Trails Master Plan as a regional trail (Bay Area Ridge Trail and Juan Bautista de Anza National Historic Trail) and as a subregional trail. The north portion features a paved multi-use trail popular with bicyclists, rollerbladers, and hikers. South of Metcalf Road, an equestrian trail parallels the paved trail (County of Santa Clara, Parks and Recreation Department 2006b).

County Parks is implementing the Coyote Creek Park Integrated Plan which is a combined Natural Resources Management Plan and Master Plan adopted by the County Board of Supervisors in 2007. Please refer to the Covered Activities section of this chapter for more details on the resource management plan and master plan.

Coyote Lake-Harvey Bear Ranch County Park

Coyote Lake-Harvey Bear Ranch County Park is located in the western foothills of the Diablo Range, east of San Martin. This 4,595-acre park encompasses Coyote Lake (Coyote Reservoir), providing opportunities for power boating, jetskiing, waterskiing, sailing, canoeing/kayaking and fishing. The lake contains bluegill, black crappie, channel catfish, carp, and black bass. In spring the lake is stocked with rainbow trout. The Bear and Mendoza Ranch sections of the park provide over 18 miles of hiking, biking and equestrian trails. The park is currently grazed under a managed grazing program (J. Mark pers. comm.). A master plan and natural resource management plan were adopted for this park in 2003 (County of Santa Clara, Parks and Recreation Department 2003; Rana Creek Habitat Restoration 2004).

Ed R. Levin County Park

Ed R. Levin County Park is located in the northern most tip of the study area. This 1,541-acre park combines the traditional features of an urban park with the trail system of a regional park. One of the highest points in the study area, Monument Peak, is located in the park. Hikers, equestrians, and cyclists enjoy sections of the park’s 19-mile trail system. The southern portion of the park, known as the Spring Valley Area, is named for the many springs that flow freely in this area (County of Santa Clara, Parks and Recreation Department 2006b). In portions of the park, Ed R. Levin County Park supports cattle grazing which is monitored under a natural resource management plan and managed under grazing program (D. Rocha pers. comm.).

Joseph D. Grant County Park

The 9,560-acre Joseph D. Grant County Park is the largest of Santa Clara County’s regional parks. It is located on the eastern border of the study area in the Diablo Range. Cattle grazing is allowed in some parts of the park, managed under a grazing program (D. Rocha pers. comm.) and monitored under a natural resource management plan. Hikers and equestrians have access to an extensive 52 mile trail system. Mountain bikes are permitted on nearly half of the park’s trails. The diverse trail system at the park makes this a popular place to stage large-scale organized trail events such as equestrian endurance rides, mountain bike events and foot races (County of Santa Clara, Parks and Recreation Department 2006b).

Martial Cottle Park

In 2004, 151 acres of mostly agricultural lands were donated to the County of Santa Clara and 136 acres were sold to State Parks by the owners for preservation as a historic agricultural park. The property is located in the city limits of San José but outside of San José’s planning limit of urban growth. This park is entirely surrounded by suburban development but retains some habitat value in its undeveloped state, particularly for western burrowing owls (J. Barclay pers.

comm.). While jointly owned by the County and State Parks, County Parks is responsible for the planning, development and long-term management of the park. In 2011 State Parks and County Parks completed a collaborative master planning process to define guidelines and policies for the site's development, management, operations of recreational, educational and agricultural use opportunities. Due to deed restrictions those long term operations will include intensive agricultural practices which will make it less habitable for native species.

Motorcycle County Park

Motorcycle County Park is the County's only off-road vehicle park. This 442-acre park is located in the foothills of the Diablo Range, east of the southern tip of San José, outside of San José's planning limit of urban growth. The park supports 20 miles of dirt trails (County of Santa Clara, Parks and Recreation Department 2006b).

Mount Madonna County Park

This 3,677-acre park is dominated by redwood forests characteristic of the Santa Cruz Mountains. To the east, the park overlooks the Valley; to the west, Monterey Bay. As the slopes of Mount Madonna descend toward the valley, the landscape changes from redwood forest to oak woodland, dense chaparral and grassy meadows. Hikers and equestrians have access to an extensive 20-mile trail system.

Santa Teresa County Park

Santa Teresa County Park is located in the Santa Teresa Hills ten miles south of downtown San José. This diverse 1,646-acre park offers a variety of recreational opportunities including golf, archery range, an equestrian staging area, and picnic sites for large groups. Additionally, the park offers over 18 miles of unpaved trails for equestrian, hiking and bicycle use, as well as historic resources and interpretive sites. County Parks completed a Grazing Management Plan for the park in 2011; grazing will take place once infrastructure upgrades are completed (D. Rocha pers. comm.). The Coyote Alamitos Canal, a facility owned and operated by SCVWD, crosses through the park (County of Santa Clara, Parks and Recreation Department 2006b).

Uvas Canyon County Park

Uvas Canyon County Park is located in the Santa Cruz Mountains, west of Morgan Hill and San Martin, adjacent to Uvas Reservoir. This wooded 1,133-acre park offers hiking, camping, and picnicking opportunities throughout most of the year. The park has seven miles of hiking trails.

Uvas Reservoir County Park

Uvas Reservoir County Park is located in the Santa Cruz Mountains, west of Morgan Hill and San Martin. This park is 626-acre, including the 286-acre reservoir, and is open year round for non-gas powered boating and fishing. No designated trails are available at this park (County of Santa Clara, Parks and Recreation Department 2008).

Santa Clara County Open Space Authority

The Open Space Authority was created on February 1, 1993 by the California State Legislature, in response to efforts by citizens and local governments of Santa Clara County to protect the open spaces that were being threatened by development. The Authority is governed by an elected seven-member board of directors, each representing a unique district. The Authority comprises the cities of Campbell, Milpitas, Morgan Hill, Santa Clara, and San José, as well as much of the unincorporated areas of Santa Clara County. The Open Space Authority's current annual funding is $4.1 million. The Open Space Authority administers an Urban Open Space Program, which allocates annual funding to the cities within its jurisdiction for open space, habitat and recreational purposes.

The Open Space Authority's Board has defined its purpose as follows.

> Preservation of Open Space and creation of greenbelts between communities, lands on the valley floor, hillsides, viewsheds and watersheds, baylands and riparian corridors, are immediate high priorities. These are needed to counter the continuing and serious conversion of these lands to urban uses, to preserve the quality of life in the County and to encourage outdoor recreation and continuing agricultural activities.
>
> Development and implementation of land management policies that provide proper care of open space lands and allow public access appropriate to the nature of the land for recreation are consistent with ecological values and compatible with agricultural uses (Santa Clara County Open Space Authority 2005).

The Open Space Authority operates in approximately the same area as that Plan study area. As of June 2009, the Open Space Authority has preserved 14,494 acres within the study area. Acquisitions have included Rancho Cañada del Oro Open Space Preserve, Sierra Vista Open Space Preserve, and Palassou Ridge Open Space Preserve, which are located in the study area and may contribute to the Plan's conservation strategy (see following discussion below). The Open Space Authority has protected other lands in the Coyote Valley and eastern Diablo Range foothills, as well as agricultural lands located in the southern portion of the county. The Open Space Authority's properties are protected through a combination of conservation easements, fee title purchase, and management agreements (Santa Clara County Open Space Authority 2005). Field staff oversee a wide variety of environmental stewardship, restoration, and monitoring projects. Docents and volunteers provide additional stewardship, interpretation, and outdoor education services.

Rancho Cañada del Oro Open Space Preserve

The 3,602-acre Rancho Cañada del Oro Open Space Preserve is located adjacent to Calero County Park, southwest of San José. Opened in 2004, the facility includes a parking area, restrooms, picnic tables, and an equestrian staging area.

The preserve currently supports more than 13 miles of trails. (Santa Clara County Open Space Authority 2010).

Palassou Ridge Open Space Preserve

The 3,515-acre Palassou Ridge Open Space Preserve (formerly Lakeview Meadows) is located at the eastern edge of Coyote Reservoir, west of Henry W. Coe State Park. This area provides opportunities for preserving uninterrupted habitat corridors and significant riparian and watershed resources between Henry W. Coe State Park and Coyote Lake Harvey Bear Ranch County Park. Trail connections to Henry W. Coe State Park and potentially to the Nature Conservancy lands could provide public access and a component of a future regional trail network.

Sierra Vista Open Space Preserve

The 1,676-acre Sierra Vista Open Space Preserve is located adjacent to Alum Rock Park in the eastern foothills above San José. The preserve encompasses oak woodlands, chaparral, and rolling grasslands, and provides habitat for numerous rare plant and wildlife species. The preserve currently includes more than 10 miles of trails including a portion of the Bay Area Ridge Trail. The Open Space Authority has received grant funding for planning, design, and construction of additional trails and a visitor parking and staging area.

City Parks

Each of the three cities covered by the Plan supports a network of parks and open space. The majority of these parks are managed for intensive recreational use and include such features as athletic facilities, community centers, turf fields, picnic areas, and trails.

Few of the city parks provide important plant or wildlife habitat. One exception is Alum Rock Park in San José. This 740-acre park provides habitat for a variety of wildlife including mountain lions, bobcats, deer, and many small animals. Other city parks that may have important habitat value include Penitencia Creek Park in San José, and Eagle Ridge open space, Uvas Creek Park Preserve, and Christmas Hill Park in Gilroy.

Development Mitigation Sites

All three cities and the county frequently require development projects with significant habitat or scenic resources to set aside a portion of their parcel and dedicate it as permanent open space. In other cases, development projects without enough resources on site are required to conserve land off site. These dedications are often conservation, open space, or scenic easements that are recorded with the property title. Older easements were often dedicated without any provision for habitat maintenance or monitoring. However, newer easements often contain these provisions and provide endowments or other funding mechanisms to ensure long-term maintenance and monitoring. Sometimes the mitigation sites are transferred to or managed by local land agencies such as the Open Space Authority.

The Nature Conservancy

Since its founding in 1958, The Nature Conservancy has developed in-depth, science-driven conservation plans for areas throughout the US and the world and has worked on more than 100 projects and preserves in California. Currently, The Nature Conservancy is working to preserve land in central California's Diablo Range between the Silicon and Central Valleys, including Mount Hamilton and its surrounding foothills. The Conservancy's Mount Hamilton Project seeks to protect the most ecologically critical 500,000 acres of this landscape by working with local cattle ranchers, public agencies, and other partners. The Mount Hamilton Project, launched in 1998 with the acquisition of the 32,800-acre Simon Newman Ranch in Stanislaus and Merced Counties, and the 28,100-acre Romero Ranch in Stanislaus and Santa Clara Counties, seeks to protect 250,000 acres of wilderness land through outright acquisitions and conservation easements (The Nature Conservancy 2006). In early 2008, this effort was bolstered by the establishment of a conservation easement on the 28,359-acre San Felipe Ranch. To date, The Nature Conservancy has permanently protected roughly 110,000 acres in the Mount Hamilton Range, approximately 51,350 acres of which are in the study area (**Table 2-2**).

The Nature Conservancy's strategy is to protect ecologically sensitive or unique sites and to connect the extensive public lands in the area—state, County and regional parks; university lands; and water district holdings—by securing the permanent protection of key private properties that surround and link them through conservation easement or purchase in fee title. The Nature Conservancy has been involved as a stakeholder in NCCP planning processes since the creation of the NCCP Act and has a long history of successful acquisition and stewardship efforts in NCCP reserve areas throughout the state.

Within the study area, The Nature Conservancy has acquired both permanent conservation easements and 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 (The Nature Conservancy 2006).

2.2.5 Protection and Resource Management Status of Open Space Lands

Public and private open space lands within the study area are subject to a variety of resource-management regimes. As a result, existing open space provides different habitat quality for the covered species and natural communities. Because some of these existing open space lands may be relied upon to support the Reserve System, existing open space areas need to be distinguished by their values for the Plan conservation strategy. To do this, open space lands have been categorized as described below.

The value of protected open space areas for covered species and natural communities is greatest when land use protections are in place in perpetuity. The value of open space for the Plan is similarly improved when a natural resource management plan is in place and adequate funding exists to maintain or enhance populations or natural communities. Open space areas that do not have land use protections in perpetuity but do have ecological protection as their primary management goal may still support the Reserve System. However, unless permanent conservation easements are acquired for these areas, they will not be part of the Reserve System because of the risk of changes in land use or resource management emphasis.

The following classification of open space was developed to account for differences in land use protections and resource management emphasis and to assist in the development of the Plan conservation strategy.

Open Space Classification

Protection and resource management status of open space lands has been evaluated and classified based on the level of land use protection and the general level of ecological management. Each open space unit within the study area was assigned one of four resource management types as shown in **Table 2-3**. The decision-making process used to assign open space lands to these types is shown in **Figure 2-4**.

Lands assigned to Type 1 and Type 2 open space categories have natural resource management and ecological protection as their primary purpose. Type 1 open space lands are protected from land use change by irrevocable means such as a conservation easement in perpetuity; or a local, state, or federal law. Local examples of Type 1 open space include lands owned by The Nature Conservancy, lands that are under a permanent conservation easement, and habitat or species mitigation lands subject to permanent easement. It is understood that the extent of ecological protection and management that actually occurs on these lands is subject to the availability of funding. The designation of Type 1 or Type 2 open space notes that the land use protections are in place on those lands, provided the funding becomes available.

If land use protections are not in perpetuity, but the purpose of land management is still ecological protection, then the land is assigned to Type 2 open space. If ecological protection is not the primary goal, but the land is managed as open space with some ecological value[5], then it is assigned to Type 3 open space. If

[5] Allows multiple species to complete some portion of their life cycle (e.g., reproduction, growth, foraging) or provides critical refuge and movement opportunities (e.g., migration corridor).

the land is managed as open space, but offers little or no long-term or measurable ecological value, then it is assigned to Type 4 open space.

There are various types of open space in the unincorporated county in the study area including: 45,786 acres of Type 1 open space; 76,606 acres of Type 2; 37,065 acres of Type 3; and 4,109 acres of Type 4. Ninety one percent (91%) of all open space in the unincorporated county within the study area is owned by five entities: the California Department of Fish and Game owns 2%, the Open Space Authority owns 7%, The Nature Conservancy owns 23%, County Parks owns 24%, and State Parks owns 35%.

2.3 Covered Activities

This section describes the activities and projects within the permit area that will be covered by the final permits and for which the Plan will provide avoidance, minimization, and compensation (i.e., conservation) for impacts to covered species and natural communities. "Activities" are actions that occur repeatedly in one location or throughout the permit area. "Projects" are well-defined actions that occur once in a discrete location. Together, these activities and projects are the *covered activities* for which incidental take authorization from the Wildlife Agencies will be obtained. All activities described in Section 2.3 *Covered Activities* are covered activities that have been analyzed in Chapter 4 *Impact Assessment and Level of Take* unless specifically identified as not covered. Covered activities described in Sections 2.3.1 through 2.3.7 are covered activities that will be implemented by the Local Partners and private developers subject to the jurisdiction of the Local Partners. Covered activities described in Section 2.3.8 *Conservation Strategy Implementation* are associated with implementation of the Plan's conservation strategy or recreation in the Reserve System and will be the responsibility of the Implementing Entity or, in the case of recreation, the owner of the land in the Reserve System (e.g., Implementing Entity, County Parks, Open Space Authority).

All parties seeking coverage for activities and projects under the Plan must obtain approval from the Permittee with jurisdiction over the activity or project or the location where the activity or project is proposed for implementation (city, County, or special district; see Chapter 6 *Conditions on Covered Activities and Application Process* for a description of the approval process).

All covered activities must incorporate the relevant conditions on covered activities described in Chapter 6 in order to avoid or minimize impacts to covered species and natural communities. Part of the approval process for parties seeking coverage under the Plan is demonstration that the conditions have been incorporated or will be incorporated properly into proposed projects. The descriptions of covered activities in this chapter have been written to be as consistent as possible with the conditions in Chapter 6. If any inconsistencies remain, the condition takes precedence over the description in this chapter. For complete details on the conditions on covered activities, see Chapter 6.

Projects and activities may only be covered if a Local Partner has control over design, avoidance and minimization, and mitigation associated with the project (as described in Chapter 5 *Conservation Strategy* and Chapter 6 *Conditions on Covered Activities and Application Process*). Local Partners may partner with other federal or state agencies, (e.g., the Corps or the California Department of Transportation) to develop the project, but the Local Partner must have control over the above described aspects of the project in order to ensure the terms of this Plan are implemented.

Development projects, or portion thereof, that are in the process of receiving local jurisdiction approvals at the time the Habitat Plan is adopted (i.e., “pipeline projects”) will not be subject to the Habitat Plan if all of the following apply:

1. it has received at least one of the following approved development entitlements with a specified expiration date (including allowed renewals/extensions) prior to Habitat Plan adoption: site and architectural permit/approval, planned development approval, conditional use approval, or a tentative map; and
2. it is issued a grading or building permit within 1 year of issuance of the Habitat Plan’s state and federal incidental take permits; and
3. the project review process identified no impacts to any of the Habitat Plan’s covered species.

This provision applies only to the portion of a project that is issued grading and/or building permit(s) within the 1-year period.

Activities or projects that do not fall clearly within the descriptions provided in this chapter will be evaluated on a case-by-case basis. If the Implementing Entity determines that a specific type of project or activity is not included within the descriptions in this chapter, then it will not receive coverage under this Plan. Any uncertainties regarding whether a type of project or activity can receive coverage under this Plan will be resolved by the Implementing Entity.

A described activity or project will be covered under the Plan if:

- the activity or project does not preclude achieving the biological goals and objectives of the Plan (see Chapter 5 *Conservation Strategy*) as determined by the Implementing Entity at the time the covered activity is proposed. For projects where there is some question whether or not the biological goals and objectives of the Plan may be precluded, the determination will be made by the Implementing Entity in coordination with the Wildlife Agencies;
- the activity or project is conducted by, or is subject to the jurisdiction of, one of the Permittees (see Chapter 8 *Plan Implementation* for a mechanism for a non-permittee to receive coverage under the Plan);
- the activity or project is a type of impact evaluated in Chapter 4 of the Plan; and

- adequate take coverage[6] under the permits remains available for other covered activities.

This definition includes projects that are currently anticipated and identified in this chapter, but that do not yet have fully developed project descriptions or plans. Provided that these projects meet the criteria above, they may be covered by this Plan. Project-specific identification as a covered activity, either in this chapter or through a future determination by the Implementing Entity, does not imply or grant entitlement for implementation. Project applicants are required to gain other project approvals from local jurisdictions and other regulatory agencies as necessary.

All covered activities described in this chapter apply to the two permits (CDFG and USFWS), with one exception. The use of pesticides, including herbicides and rodenticides, is not covered by the federal permit because USFWS has not authorized the EPA to certify their use.

2.3.1 Methods for Identifying Covered Activities

To begin the process of determining covered activities, the Permittees developed comprehensive lists of activities and projects under their direct control or jurisdiction that might have a need for take coverage. The following five criteria were used to screen the lists. Candidate activities and projects needed to meet all five criteria to be considered covered activities under the Plan.

1. **Location:** The project, activity, or government service will occur within the Plan permit area.
2. **Timing:** Construction of the project or implementation of activities is scheduled to begin after the Plan is approved and the project is completed within the term of the permit.
3. **Impact:** The project or activity has a reasonable potential or likelihood to take a covered species. Highly unlikely or speculative take will not meet this criterion.
4. **Definition:** The location, size, and other relevant aspects of the project or activity can be defined well enough such that direct and indirect impacts to covered species can be evaluated and conservation measures developed to mitigate those impacts.
5. **Practicability:** Inclusion of the project, activity, or government service as a covered activity will not result in undue delays or substantial additional cost to Plan development and permitting process relative to the benefit of including the project/activity in the permit. In other words, it will not be more cost effective to permit the project/activity separately. Examples of impractical covered activities are ones that, on their own, would add

[6] Take coverage is defined in this Plan in terms of land cover type, modeled habitat (see **Tables 4-2 and 4-4**), and occurrences of covered plants (see **Table 4-6**) adversely affected as a result of covered activities.

additional covered species, generate substantial controversy, or significantly complicate the impact analysis.

Covered Activity Categories

For the purposes of this Plan, covered activities fall into seven general categories.

- Urban Development.
- In-stream Capital Projects.
- In-stream Operations and Maintenance.
- Rural Capital Projects.
- Rural Operation and Maintenance.
- Rural Development.
- Conservation Strategy Implementation (activities within the lands managed, enhanced, restored, and monitored to conserve the natural resources targeted by this Plan).

Covered activities are identified below for each of these seven categories. The activities described are those activities for which incidental take authorization will be requested by the Permittees.

The activities identified below broadly define all of the different types of activities covered by this Plan. In some cases, specific projects are identified as examples to illustrate the general category. However, if a given project meets the guidelines for covered activities as described in the first part of this section, then that project is a covered activity.

It is expected that the Permittees will develop additional activities and projects over the course of the permit term of this Plan. To the extent that these additional activities and projects are generally and qualitatively described below, meet the criteria in Section 2.3 *Covered Activities* above, are not expressly limited by this chapter, and are adequately evaluated in Chapter 4 of this Plan, these future activities and projects will also be covered by this Plan.

Descriptions of covered activities in this chapter are mostly qualitative. Additional quantitative assumptions of covered activity footprints and frequency of occurrence are described in the impact analysis methodology in Chapter 4.

2.3.2 Urban Development

This category includes projects and activities that occur inside the planning limits of urban growth (see **Figure 2-2**) but outside of in-stream areas (steams and adjacent riparian vegetation) and excluding those areas identified in Section 2.2.3 *Planning Limits of Urban Growth* as these will be developed consistent with rural development land use patterns. In-stream covered activities are discussed in Sections 2.3.3 *In-Stream Capital Projects* and 2.3.4 *In-Stream Operations and Maintenance*. This category is intended to be as inclusive as possible to accommodate urban growth and all ground-disturbing activities within designated urban areas. It includes the construction and maintenance of typical urban facilities, public and private, consistent with local general plans and local, state, and federal laws. This category of covered activities includes, but is not limited to, the construction, maintenance, and use of the following urban facilities.

- Residential, commercial, industrial, and other types of urban development within the cities of Gilroy, Morgan Hill, and San José planning limits of urban growth in areas designated for urban or rural development, including areas that are currently in the unincorporated County (i.e., in “pockets” of unincorporated land inside the cities’ planning limits of urban growth).
- Residential, commercial, industrial, and other types of urban development within the San José–designated North Coyote Campus Industrial Area in areas with land use designated for urban development, rural development, and agricultural development as identified in **Figure 2-2**.
- Transportation facilities including sidewalks, bike paths, paved and unpaved roads, bridges, culverts, and transit facilities.
- Public service and cultural facilities including new fire stations, police stations, community policing centers, communications facilities, public administration centers, convention centers, theatres, museums, community centers, community gardens, and concession buildings.
- Recreational facilities such as neighborhood parks, dog parks, soccer fields, golf courses, indoor and outdoor sports centers, racetracks, campgrounds, and trails, and associated infrastructure including roads, bridges, parking areas, and restrooms.
- Public and private utilities including electric transmission and distribution lines, telecommunications lines, and gas pipelines. Solar energy projects are covered by the Plan as long as their impacts to covered species and natural communities are consistent with the evaluation of effects in Chapter 4.
- City water delivery and storage facilities including water treatment plants, water supply pipelines, percolation ponds, and pump stations (SCVWD is the water wholesaler in the county and serves local water suppliers).
- Stormwater management facilities such as storm sewer systems, nonpoint source reduction, outfalls, and drainage improvements.
- Waste-management facilities including sewage-treatment plants, sanitary sewer systems and rehabilitation, water recycling, recycling centers, transfer stations.
- Funeral/interment services including mortuaries, crematorium, columbaria, mausoleums, and similar services when in conjunction with cemeteries.
- Vegetation management including fuel reduction (including hand and mechanized removal and controlled burns), tree removal and pruning,

grazing activities, exotic vegetation control/removal, hazardous tree work, weed abatement, algae control in ponds.

- Hazardous material remediation for, and restoration related to, abandoned dumps (e.g., Singleton Landfill).

The Cities of San José, Gilroy, and Morgan Hill have developed several planning documents that outline strategies and projects consistent with current general plans. Examples of current plans that apply to planning in urban areas within the study area include the following.

- City of San José Greenprint (City of San José 2000).
- City of San José Alum Rock Park Riparian Management Plan (Biotic Resources Group 2001).
- City of San José Sanitary Sewer Master Plan (City of San José 2004).
- City of San José Storm Sewer System Capital Program (City of San José 2006b).
- City of San José Sanitary Sewer System Capital Program (City of San José 2006c).
- City of San José and City of Santa Clara Draft San Jose/Santa Clara Water Pollution Control Plant Master Plan (City of San José and City of Santa Clara 2011)[7].
- City of Morgan Hill Redevelopment Agency Implementation Plan (City of Morgan Hill 2004).
- City of Morgan Hill Downtown Specific Plan (City of Morgan Hill 2009).
- City of Morgan Hill Parks, Facilities & Recreation Programming Master Plan (City of Morgan Hill 2001c).
- City of Morgan Hill Bikeways Master Plan Update (City of Morgan Hill 2008).
- City of Morgan Hill Trails and Natural Resources Study (City of Morgan Hill 2007).
- City of Morgan Hill Capital Improvement Program (City of Morgan Hill 2002a).
- City of Morgan Hill Sewer System Master Plan (City of Morgan Hill 2002b).
- City of Morgan Hill Storm Drainage System Master Plan (City of Morgan Hill 2002c).
- City of Morgan Hill Water Master Plan (City of Morgan Hill 2002d).
- City of Morgan Hill Environmental Programs (City of Morgan Hill 2007).
- City of Gilroy Bicycle Master Plan (City of Gilroy 2002c).

[7] Only those portions of the San José/Santa Clara Water Pollution Control Plant Master Plan area that are inside the study area (which does not include the extended study area for burrowing owl conservation) may be covered by the Habitat Plan.

- City of Gilroy Parks and Recreation Systems Master Plan (City of Gilroy 2002d).
- City of Gilroy Sanitary Sewer Master Plan (City of Gilroy 2004a).
- City of Gilroy Storm Drain Master Plan (City of Gilroy 2004b).
- City of Gilroy Traffic Master Plan (City of Gilroy 2004c).
- City of Gilroy Water Master Plan (City of Gilroy 2004d).
- City of Gilroy Glen-Loma Specific Plan (City of Gilroy 2005a).
- City of Gilroy Trails Master Plan (City of Gilroy 2005c).
- City of Gilroy Wastewater Treatment Plant Master Plan (City of Gilroy 2006b).
- South County Recycled Water Master Plan (Santa Clara Valley Water District and South County Regional Wastewater Authority 2004).

Additional plans will be developed over the course of the permit term of this Habitat Plan. Activities proposed in these future plans that are consistent with the criteria in Section 2.3 *Covered Activities* and that have been adequately addressed in the impacts analysis contained in Chapter 4 and the conservation strategy described in Chapter 5 will also be covered by this Plan.

Private Development Subject to the Plan

Private development activities that require ground disturbance are subject to the Habitat Plan if the activity meets the following criteria.

1. The activity is subject to either ministerial or discretionary approval by the County or one of the cities;
2. The activity is described in Section 2.3.2 *Urban Development* or in Section 2.3.7 *Rural Development*; and
3. In **Figure 2-5**[8], the activity is located in an area identified as "Private Development is Covered," OR

   The activity is equal to or greater than 2 acres AND the project is located in an area identified as "Rural Development Equal to or Greater than 2 Acres is

[8] **Figure 2-5** *Private Development Areas Subject to the Plan* was developed to distinguish areas where, with respect to future rural development, there is higher biodiversity and a greater chance for "take" of covered species versus areas where habitat values are lower and the potential for "take" is relatively low. Information sources used in defining these areas included USFWS critical habitat; areas mapped by the Plan (**Figure 3-10**) as serpentine, wetland, stream, riparian, or pond land cover types; conservation analysis zones with a "high" conservation effort designation (**Figure 5-7**); and mapped occurrences of covered wildlife species. In areas where this information indicated a higher potential for presence of covered species, rural development projects are subject to the Habitat Plan. In areas where the information indicates a low probability that covered species are present, rural development projects are not subject to the Habitat Plan. **Figure 2-5** will be updated throughout the permit term to reflect new information collected during Plan implementation.

Covered," or "Urban Development Equal to or Greater than 2 Acres is Covered" OR

The activity is located in an area identified as "Rural Development is not Covered" but, based on land cover verification of the parcel (inside the Urban Service Area) or development area (for rural development projects; see Section 6.8 *Habitat Plan Application Package*), the project is found to impact serpentine, wetland[9], stream, riparian, or pond land cover types; or the project is located in occupied or occupied nesting habitat for western burrowing owl (see **Figure 5-11** and **Appendix D** *Species Accounts*).

In addition, private development additions of less than 5,000 square feet of new impervious surface to existing developed sites, regardless of parcel size, are not subject to the Plan.

Projects that are not subject to the Habitat Plan because they do not meet these criteria are *not exempt from compliance with the ESA or CESA*. If a project has the potential to take a federally or state listed species, the applicant must contact USFWS and/or CDFG to determine whether a take authorization should be obtained. Project applicants may request to "opt in" to the Habitat Plan and receive take coverage by complying with all of the conditions and application processes described in this Plan (see Chapter 6). Opt in coverage is not guaranteed and will be authorized by the local jurisdiction in consultation with the Implementing Entity.

This coverage determination process only applies to private urban and rural development that requires a permit from a city or the County. It does not apply to activities initiated by the Local Partners or Participating Special Entities (see Section 8.4 *Participating Special Entities* for more information).

2.3.3 In-Stream Capital Projects

The term *in-stream* is defined for the purposes of this Plan as the stream bed and bank, and the surrounding adjacent riparian corridor. This category addresses public infrastructure projects that occur within streams. Activities within streams are those activities or projects that occur in or immediately adjacent to creeks and that may result in impacts to a creek or canal. This category includes activities in the stream channel, along the stream bank, and adjacent lands at top-of-bank within the riparian corridor. These covered activities occur in both urban and rural areas. Known locations of in-stream capital projects are shown in **Figure 2-6**. The operation and maintenance of these projects, as well as existing facilities, are described in Section 2.3.4 *In-Stream Operations and Maintenance.*

In-stream capital projects and activities that are covered under this Plan include the following activities.

[9] If during the environmental review process it is shown that a project has adverse indirect impacts to a wetland's function (change in hydrological functions, etc.), the project will be subject to the Plan.

- Activities described above under Section 2.3.2 *Urban Development* that overlap with streams. Activities include transportation, water supply, wastewater management, and stormwater management.
- Construction or reconstruction of flood protection projects and maintenance of associated access roads (see discussion in following section).
- Reconstruction of levees.
- Three Creeks Habitat Conservation Plan geomorphic rehabilitation and gravel program.
- Reconstruction, realignment, and decommissioning of SCVWD canals.
- Dam-related capital projects.
- In-channel groundwater recharge facilities.
- Bridge construction, replacement, and major repair including vehicular, train, and pedestrian bridges (see discussion in following section below).
- Bridge construction in County parks including vehicular bridges, multi-use bridges, footbridges, puncheons, and rock bridges (i.e., rocks placed across a small stream along a single-track trail).
- Culvert installation and maintenance.
- Creekside trail projects and associated bridges (trails are discussed in more detail in Section 2.3.5 *Rural Capital Projects*).
- Implementation of SCVWD's Dam Instrumentation Project. Activities include a field geotechnical exploratory drilling program and providing a corresponding Automated Data Acquisition System for the eight SCVWD dams within the study area (see discussion below).
- Fish passage barrier removals.

Capital projects that are covered under this Plan are discussed in more detail in the following sections.

Flood Protection Projects

SCVWD maintains a rolling 5-year Capital Improvement Program that determines which projects are developed over time. SCVWD has several capital projects planned to address flood protection. These projects have been identified through various programs that provide different funding mechanisms and guiding principles of how projects will be planned and designed. Two such programs are the Clean, Safe Creeks and Natural Flood Protection Plan and the Coyote Watershed Stream Stewardship Plan. Each plan is briefly described below. Flood protection projects identified in these plans are described at the end of this section.

The Clean, Safe Creeks and Natural Flood Protection Plan is a single, countywide special tax–funded 15-year plan, part of the SCVWD flood protection and stream stewardship program. Performing public oversight for this program is an independent monitoring committee, which annually reviews the implementation of the Program. As part of the Clean, Safe Creeks and Natural Flood Protection Program, SCVWD is directed to protect public health and safety and enhance the quality of life within Santa Clara County. Initiated in 2000, it identifies four outcomes: provide flood protection, protect water quality, enhance and restore in-stream and riparian ecosystems, and provide recreational access. The first outcome, flood protection, includes the flood control capital control projects. During project planning, flood protection projects are prioritized by flooding history, damage estimates, and economic impacts. Project design protects against a 1% flood while improving water quality, restoring natural habitat, and providing recreational and operations and maintenance access (Santa Clara Valley Water District 2000). Of the covered flood protection capital projects described below, improvements to Berryessa Creek, Coyote Creek, and Upper Penitencia Creek are partially funded by the Clean, Safe Creeks and Natural Flood Protection Plan.

The Coyote Watershed Stream Stewardship Plan addresses flooding and environmental issues through an integrated approach to watershed management. SCVWD developed the Coyote Watershed Stream Stewardship Plan to provide a strategic approach for implementing the Ends Policy using a watershed management approach to provide stream stewardship within the Coyote watershed. The Ends Policy, in part, envisions a watershed in which (1) there is a healthy and safe environment for residents and visitors, and (2) there is an enhanced quality of life in Santa Clara County (Santa Clara Valley Water District 2002). This plan documents long-range projections of several agencies, incorporates information from ongoing SCVWD projects, and defines future projects and strategies to achieve SCVWD's Ends Policy in the watershed. Projects implemented under this plan include, but are not limited to, flood control projects, new trails, acquisition of open space, and stormwater detention and infiltration (Santa Clara Valley Water District 2002). Examples of projects partially funded through the Coyote Watershed Stream Stewardship Plan include the Berryessa Creek Project and the Lower Silver Creek between Interstate 680 (I-680) and Lake Cunningham. In designing projects through both programs, SCVWD uses methods that balance flood protection with protection of streams and natural resources. Examples of these methods include expanding the in-channel flood plain in areas where the existing channel is highly constrained, and installing bypass channels to reduce the quantity of water flowing through natural streams during high flows, thus reducing flooding and scouring potential. These flood-protection technologies help keep streams as natural as possible.

Flood Protection Project Design Elements

Flood protection capital improvement projects incorporate design elements that provide onsite impact avoidance, minimization, and mitigation for both in-stream and riparian habitat. Enhancement and creation of riparian habitat is coupled with removal of invasive species and planting of native species. In-stream design elements include fish passage improvement through the removal of fish barriers, placement of fish ladders, and other in-stream habitat enhancements. Finally, design elements protect in-stream water quality by reducing erosion, sedimentation, and turbidity, as well as removing unauthorized storm drain outfalls (Santa Clara Valley Water District 2000).

Flood control design components that may be utilized include those listed below.

- Regrading of bank slopes.
- Realignment of the historic full channel or active low-flow channel.
- Installation of hardscape, including at stream crossings (concrete or riprap).
- Installation of grade control features (e.g., check dams, vortex weirs, cross vanes, drop structures, step pools, and rock riffles) to control erosive velocities.
- Temporary stream diversion during construction.
- Planting[10].
- Channel widening.
- Levee reconstruction activities including installation or improvement of floodwalls and/or levees. Flood protection levee work may result in a raised or expanded levee. (Reconstruction activities are further described in the following section *Levee Reconstruction*.)
- Permanent bypass or diversion channel construction.
- Acquisition of right-of-way and maintenance road construction.
- Installation of culverts or outfall structures, including inlet and outlet structures for detention basins.
- Off-channel detention basins.

Planning and design of flood protection projects requires several years to decades to complete. Construction may take weeks or years to complete, depending on whether the project is phased over time and the nature of the project in a given reach. The process is often complicated when multiple agencies are participating in the project. As such, it is difficult to identify a timeline within which these projects may be implemented. SCVWD will apply all conditions as described in Chapter 6 when implementing flood protection projects, including review and approval by the Wildlife Agencies as described in Section 8.7.3 *Wildlife Agency Responsibilities*.

Those projects for which project descriptions are currently available are described below. For those projects for which no project description has been developed, a brief description of project location is provided. These projects will contain the same types of design elements as those for which a project description has been developed because of SCVWD’s commitment to flood protection and stream stewardship as described above. **Tables 4-5a** and **4-5b**

[10] All planting will be implemented to allow proper flood conveyance and will consist of hydroseeding on all earthen surfaces above the channel bed and tree planting at the top of bank, with a few additional trees planted on bank slopes and at toe-of-slope.

describe key assumptions used to estimate impacts associated with these projects that could not be fully described during Plan development.

Coverage for SCVWD flood protection projects is limited to 64 miles of total project length with a maximum of 3.1 miles of permanent stream impacts.

Coyote Watershed

Berryessa Creek—I-680 to Old Piedmont Road. Berryessa Creek is a tributary of Coyote Creek located in San José. The project extends approximately 2 miles between I-680 and just upstream of Old Piedmont Road. Currently the creek has sections that are natural, a section that is a trapezoidal concrete channel, and a concrete lined in-stream sediment basin. Specific design details for this project area have not been developed at this time; however, they will be consistent with the design elements described above.

Coyote Creek—U.S. 101/I-85 to Metcalf Road. Coyote Creek is an urban stream within San José. This reach is 5.6 miles and is bordered by the Coyote Creek Park. Between I-85/U.S. 101 interchange and Metcalf Road, the reach is modified to form the Parkway Lakes. The project extends from the I-85/U.S. 101 to Metcalf Road. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above.

Coyote Creek—I-280 to U.S. 101. Coyote Creek is an urban stream within San José. This reach is 6.7 miles and is bordered by the Coyote Creek Park. The project extends from I-280 to U.S.101. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above.

Fisher Creek—Bailey Avenue to Hale Avenue. Fisher Creek is a tributary of Coyote Creek. The reach is 5.4 miles and flows from Morgan Hill through unincorporated San José and into Coyote Creek at its intersection with Monterey Highway in San José. The project extends from Bailey Avenue in unincorporated San José to Hale Avenue in Morgan Hill. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above. It is possible that the City of San José will be the lead on this project instead of SCVWD.

Mid-Coyote Creek—Montague Expressway to I-280. The project extends approximately 6.1 miles between Montague expressway and I-280, all in the City of San José. Still in the planning phases, the project is expected to include channel capacity improvements such as levee construction, channel excavation, bridge replacement, property acquisition and structural removal. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above.

Quimby Creek—Thompson Creek to Headwaters. Quimby Creek is a tributary of Thompson Creek. Within San José it is highly channelized. The project extends 1.2 miles from Thompson Creek to its headwaters. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above.

Sierra Creek—Berryessa Creek to Headwaters. Sierra Creek is a tributary of Berryessa Creek in San José. Within the urban limits it is highly channelized, composed of a concrete trapezoidal channel. The project extends 2.4 miles from the stream's headwaters to Berryessa Creek. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above.

South Babb Creek—Lower Silver Creek to Headwaters. South Babb Creek is a tributary of Lower Silver Creek extending from unincorporated San José into San José. It is currently a culvert/trapezoidal concrete channel. Specific design elements for this 0.9 mile project have not been developed at this time; however, they will be consistent with the design elements described above.

Upper Penitencia Creek—Coyote Creek to Dorel Drive. This project occurs along approximately 4.2 miles of Upper Penitencia Creek, from the confluence with Coyote Creek to Dorel Drive. Project goals include the following.

- Provide one-percent flood protection to more than 5,000 homes, businesses and public buildings;
- Improve stream habitat values and fisheries potential;
- Reduce sedimentation and maintenance requirements;
- Identify opportunities to integrate recreation improvements consistent with the Master Plan of the City of San José and Santa Clara County Parks;
- Obtain a Letter of Map Revision from the Federal Emergency Management Agency (FEMA); and
- Incorporate SCVWD's Clean, Safe Creeks and Natural Flood Protection Program objectives.

Design elements include a concrete culvert, percolation pond, realignment of the creek at I-680, levees and floodwalls, modified floodplains, and residential home floodproofing.

Upper Silver Creek—U.S. 101 to Coyote Creek. Upper Silver Creek is a tributary of Coyote Creek within San José. They converge just south of Coyote Creek's intersection with Capitol Expressway and northwest of U.S. 101. The channel is composed of earthen levees and excavated earth. The project extends 0.7 mile from U.S. 101 to Coyote Creek. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above.

Upper Silver Creek—U.S. 101 to Silver Creek Road. Upper Silver Creek is a tributary of Coyote Creek within San José. They converge just south of Coyote Creek's intersection with Capitol Expressway and northwest of U.S. 101. The channel is composed of earthen levees and excavated earth. The 1.2 mile project extends from U.S. 101 to Silver Creek Road. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above.

Guadalupe Watershed

Alamitos Creek—Guadalupe River to Almaden Dam. The project extends 7.4 miles from Almaden Dam to the Guadalupe River. Specific flood protection design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above. In addition, design elements will also include fish barrier modifications both at the gabion structure upstream of Mazzone Drive and at the creek's confluence with the Guadalupe River.

Arroyo Calero—Alamitos Creek to Calero Dam. Arroyo Calero runs from Calero Reservoir to Alamitos Creek through unincorporated County into San José. The project extends the entire 4 mile extent of the arroyo. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above.

Canoas Creek—Guadalupe River to Cotle Road. The project extends 7.4 miles from Canoas Creek's confluence with the Guadalupe River to Cotle Road. Design elements include the construction of 3.5-foot-high floodwalls along Canoas Creek from Almaden Expressway to the end of Nightingale Drive (Santa Clara Valley Water District 1999).

Los Gatos Creek—Kirk Dam to Lark Avenue. Los Gatos Creek is a tributary of the Guadalupe River. The project extends 0.7 mile from Kirk Dam to Lark Avenue within the cities of Los Gatos and Campbell, within a right-of-way owned by SCVWD. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above.

Randol Creek—Alamitos Creek to Bret Harte Drive. Randol Creek is a highly channelized tributary of Alamitos Creek in San José. It is primarily a trapezoidal earthen channel with periodic concrete structures for flood control purposes. The project extends approximately 0.5 mile from Bret Harte Drive to Alamitos Creek. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above.

Ross Creek—Guadalupe River to Kirk Avenue. Ross Creek is a highly channelized tributary of the Guadalupe River. It is primarily a trapezoidal earthen channel with periodic and various hard structures for flood and bank protection purposes. The approximately 1.6-mile project reach extends from Guadalupe River to Kirk Avenue in San José. Currently, Ross Creek is primarily a trapezoidal earthen channel. Design elements include widening the channel bottom to 30 feet with 1:1 side slopes and lining both banks with articulated concrete mat. An 18-foot maintenance road will be established on the south top of bank and depressed 3 feet below grade for security of adjacent properties. If necessary, the existing streamflow gauge station will be replaced in coordination with technical support staff. In addition, a second 20- by 10-foot RCB culvert will be added on the north side of the existing culvert under Almaden Expressway. A concrete apron will be constructed at the outlet of the culvert. The existing sewer line in Almaden Expressway will be relocated in coordination with the City. Similarly, at Jarvis Avenue, a second 13- by 9.5-foot box culvert will be constructed. Design elements will also include fish passage modifications (Santa Clara Valley Water District 1999). Where applicable, revegetation and other riparian habitat enhancements will be included.

Uvas Watershed

Gavilan Creek—Uvas Creek to Headwaters. Gavilan Creek varies from a trapezoidal earthen channel to a clay-lined channel and contains a variety of flow control structures including culverts, energy dissipaters, drop structures, pipelines, and sacked concrete riprap lining. The 3.1-mile project runs from Uvas Creek to the headwaters Gavilan Creek. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above.

Uvas-Carnadero Creek—Pajaro River to Watsonville Road. Uvas-Carnadero Creek, in the vicinity of Gilroy, is the major river in the Uvas watershed. The project will extend 13.8 miles from the Pajaro River to Watsonville Road as the upper boundary. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above. Design elements will also include fish passage and habitat modifications.

Llagas Watershed

East Little Llagas Creek—U.S. 101 to Headwaters. East Little Llagas Creek is in the vicinity of Gilroy. The project will be conducted in a rural setting and extends 0.8 mile from U.S. 101 to the creek's headwaters. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above.

Jones Creek—Llagas Creek to Alamias Creek. Jones Creek is in the vicinity of Gilroy. The project will be conducted in a rural setting and extends 2.4 miles from Llagas Creek to Alamais Creek. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above.

Lions Creek—Sta 102+00 to Headwaters. Lions Creek is in the vicinity of Gilroy. The 1.1-mile project will be conducted in a rural setting and extends from U.S. Geological Survey (USGS) gauge station 102+00 to the headwaters of Lions Creek. Specific design elements for this project have not been developed at this time; however, they will be consistent with the design elements described above.

West Little Llagas Creek—Wright Avenue to Llagas Road. The project extends 0.6 mile from Wright Avenue to Llagas Road and includes two reaches: 7 and 8a. Reach 7 is further subdivided into Reach 7a and 7b, as different design elements will be applied to each subsection. Design elements for Reach 7 are uncertain. In the Llagas Creek EIR (U.S. Department of Agriculture 1982), design elements for Reach 7a (1.6 miles) include 1 mile of excavated trapezoidal/ earthen channel with depressed maintenance roads and a rock-lined pilot channel, as well as installation of a grade stabilization structure. Design elements for Reach 7b (0.9 mile) include earthen channel excavation with a depressed maintenance road and a pilot channel. Design elements for reach 8a (1.0 mile) include installation of a rectangular concrete channel. In the more recent Llagas Status Report (Santa Clara Valley Water District 2007c), design elements for Reach 7 are not subdivided and are described as construction of an earthen channel diversion and an earthen channel.

Levee Reconstruction

SCVWD owns or maintains approximately 91 miles of levees or similar flood reduction facilities. Approximately 23 miles of these levees are within the study area. Sections of these levees are currently under the jurisdiction of the Corps, but jurisdiction is not constant and may change over the course of the permit term (e.g., a section of levee currently under Corps jurisdiction may not be under Corps jurisdiction in 20 years). Reconstruction of 10 miles of the approximately 23 miles of levees are covered by this Plan (see Section 2.4 *Projects and Activities not Covered by this Plan* for information on levee reconstruction projects that are led by the Corps). The 10 miles of levee reconstruction assumed for this Plan is additive to levee improvements conducted as part of a flood protection project. As described in Chapter 8, the Wildlife Agencies will have design review and approval authority over flood protection projects and levee reconstruction projects that are covered by the Habitat Plan.

The Corps has revised its inspection standards and compliance (enforcement) requirements for levee systems under their jurisdiction which are maintained by local agencies. Levee maintenance activities, including vegetation removal and burrow and rodent control on all levees, are permitted under SCVWD's Stream Maintenance Program and are not covered by this Plan. When structural improvements to the levees are required, either for increased flood protection or major failures in structural integrity, the Plan would provide take authorization for this levee reconstruction activity so long as they are part of another covered project such as a flood protection project or described below in this section.

Levee reconstruction activities are those that improve the existing facility through structural changes such as expanding the footprint, increasing the height of the levee, or adding new material to support the levee. Reconstructed levees will generally be constructed with in-kind materials and within the footprint of existing levees. Some changes to levee design and material may be required based on safety and design requirements. This may include adding new hardscape to the channel banks.

Levee reconstruction areas will be outside mitigation sites associated with this Plan or past projects. No reconstruction or associated clearing of riparian vegetation that provides baseline shaded riverine aquatic cover will be conducted as part of this covered activity. Furthermore, SCVWD is only seeking coverage for reconstruction of 10 of the 23 miles of SCVWD levees in the study area. The levees, or portions thereof, identified below may be reconstructed under this Plan if the Plan requirements for avoidance described in this paragraph and in Chapter 6 are met. Levee reconstruction projects are covered by this Plan only if they are specifically named below or are part of another covered project such as a flood protection project. Although there are a total of 25.1 miles of levees referenced below, this Plan only covers impacts associated with 10 miles of levee reconstruction. See **Table 4-5a** for a description of assumptions made for this covered activity.

Coyote Watershed

Berryessa Creek. Berryessa Creek is an urban creek in the Coyote watershed. It is connected to the Lower Penitencia Creek by an engineered canal. Levee reconstruction will occur between the boundary of the City of San José and Piedmont Road (approximately 0.4 miles).

Coyote Creek. Coyote Creek is the main stem of the Coyote watershed. In San José, it is primarily maintained with riparian vegetation on both sides. This vegetation extends into a chain of riverside parks along its upper extent. Levee reconstruction will occur on both sides of the creek in three different locations between the confluence with Upper Penitencia Creek and the northern edge of the permit area, north of (downstream) SR 237(approximately 1 mile).

Thompson Creek. Thompson Creek is an urban stream in the Coyote watershed. It flows through San José constrained by both a natural and modified floodplain. For much of its extent, riparian vegetation lines the banks. Levee reconstruction will occur on both sides of the creek between Aborn Road and Quimby Road (approximately 0.5 mile).

Upper Penitencia Creek. Upper Penitencia Creek is in the Coyote watershed. Levee reconstruction will occur to the west of I-680 between Berryessa Road and Mayberry Road (approximately 1.1 mile).

Guadalupe Watershed

Alamitos Creek. Alamitos Creek is a large tributary of the Guadalupe River in the Guadalupe watershed. Riparian vegetation is maintained on both sides as it flows through San José. Levee reconstruction will occur at three separate locations. Levees will be reconstructed along 3.6 miles of Alamitos Creek upstream of its confluence with Guadalupe Creek (also where Guadalupe River begins).

Canoas Creek. Canoas Creek is a tributary of the Guadalupe River in the Guadalupe watershed. Levee reconstruction will occur immediately upstream of its confluence with Guadalupe River (approximately 0.5 miles).

Guadalupe Creek. Guadalupe Creek is a tributary of Guadalupe River in the Guadalupe Watershed. Levee reconstruction will occur between where the creek approaches Coleman Road and just downstream of the confluence with Alamitos Creek (i.e., in the initial upstream reaches of Guadalupe River). Total length of levee reconstruction is approximately 1.5 miles.

Guadalupe River. Guadalupe River is the major river of the Guadalupe watershed. It is primarily maintained with riparian vegetation on both sides. Levee reconstruction will occur in several locations along Guadalupe River. From the upstream end, the first reconstruction section starts just north and ends just south of where the creek crosses the SR 85. Downstream, a short reach of levee is located just upstream of the confluence of Guadalupe River and Los Gatos Creek, between the I-280 and West Humboldt Street. Finally, levee reconstruction will occur between U.S. 101 and I-880. Total length of levee reconstruction is approximately 2.9 miles.

Los Gatos Creek. Los Gatos Creek is a large tributary of the Guadalupe River in the Guadalupe Watershed. It flows through Campbell, Los Gatos and Monte Sereno. Levees are located in three separate locations downstream of Vasona Reservoir and upstream of the San José city limits. Total length of levees is approximately 1.8 miles.

Randol Creek. Randol Creek is a highly channelized tributary of Alamitos Creek in San José. It is primarily a trapezoidal earthen channel with periodic concrete structures for flood control purposes. Levee reconstruction will occur on the east side between Camden Avenue and Bret Harte Drive (approximately 0.5 mile).

Uvas Watershed

Uvas Creek. Uvas Creek is the main stem of the Uvas watershed. Levee reconstruction will occur only on the north side of the creek between U.S. 101 and Santa Teresa Boulevard (approximately 2.2 miles) in Gilroy and unincorporated Santa Clara County near Gilroy.

Llagas Watershed

Jones Creek. Jones Creek is a small earthen tributary of Alamais Creek (a tributary to Llagas Creek) in the Llagas watershed. It flows through the agricultural landscape of unincorporated Santa Clara County, east of Gilroy and west of SR 152. Levee reconstruction will occur on its west side between its confluence with Alamais Creek between Leavesley Road and Dunlap Road (approximately 0.6 mile).

Llagas Creek. Llagas Creek is the main stem river in the Llagas watershed. It is primarily an earthen channel and passes though both unincorporated Santa Clara County and the city of Gilroy. Levee reconstruction will occur on the west side of Llagas Creek from the confluence with the West Branch Llagas Creek north to Gilman Road (approximately 0.8 mile) in agricultural areas.

Levee reconstruction is also planned for lower Llagas Creek between Southside Drive and the creek's confluence with the Pajaro River. Levee reconstruction will occur on both sides of the creek (approximately 2.4 miles).

Levees near Llagas Creek. A network of irrigation channels divert water from Llagas Creek in the Llagas watershed. Levee reconstruction will occur on one side between the Pacheco Pass Highway and Bloomfield Avenue (approximately 5.9 miles). These levees do not border Llagas Creek.

Lions Creek. Lions Creek is located partially within the planning limit of urban growth of Gilroy. The proposed levee reconstruction would occur just upstream of the confluence with West Branch Llagas Creek (approximately 0.5 miles).

West Branch Llagas Creek. West Branch Llagas Creek is a highly channelized tributary of the Llagas Creek flowing through the city of Gilroy. Levee reconstruction will occur on both sides of the creek between its confluence with the main Llagas branch and U.S. 101, predominantly in agricultural areas (approximately 1.1 miles).

Canal Reconstruction, Realignment, and Decommissioning

SCVWD anticipates needing to fully reconstruct, realign, or decommission its water conveyance canals over the course of the permit term. These canals, their associated diversions, and release points include the following.

- Almaden-Calero Canal
- Coyote Canal Extension
- Cochrane Channel
- Coyote-Alamitos Canal
- Vasona Canal
- Madrone Channel

Coyote Canal may be extended to Metcalf Road by reconstruction in place, or by replacement with a pipeline in the existing alignment or within the alignment of existing multi-use trails in this reach of Coyote Creek. Subsequent phase activities may include a pipeline to Ford Road Ponds from the Coyote Steel Dam and the Coyote Canal Extension.

Other canals will be reconstructed or replaced with pipelines in the existing footprint of current canals. Canals will be reconstructed of in-kind materials to the extent possible. Depending on the history of erosion in a canal, certain reaches may be reconstructed using gunite or other types of concrete. Most straight reaches without a history of erosion will be of compacted earth. Reconstruction of canals is assumed to result in complete loss of existing, non-developed, land cover types.

SCVWD anticipates possibly decommissioning one or more of its canals. This would be conducted only as needed and when there is a desire to use the canal site for another purpose or to use for restoration credits. Each decommission would be unique, but in general would entail removal of unnecessary concrete and other materials from the site. It is likely that decommissioning would restore canals to an enhanced state for natural resource management purposes; credits for such enhancement are not assumed in the impact analysis in Chapter 4.

Three Creeks HCP In-Stream Capital Projects

Capital projects associated with the proposed Three Creeks HCP are the seismic safety retrofit of five SCVWD dams in the permit area (Almaden, Anderson, Calero, Guadalupe, and Vasona dams) and the proposed conservation measures in the Three Creeks HCP Conservation Program. Seismic safety retrofit activities are described in the following section *Dam Seismic Safety Retrofit*. The Three Creeks HCP Conservation Program is described in the following section.

Three Creeks HCP Conservation Program

The proposed Three Creeks HCP includes activities to enhance stream conditions for steelhead, while maintaining use of these watersheds to meet the water supply needs of northern Santa Clara County. The proposed Three Creeks HCP Conservation Program will provide a comprehensive program to address the impacts of SCVWD's operation and maintenance of eight reservoirs (six of which are in the permit area), multiple diversions dams and drop structures and associated facilities (i.e., appurtenances) such as fish ladders, fish screens, and on-channel ponds; an extensive system of off-channel recharge ponds, and facilities that provide for water to be released to various channels. Although fish are not covered by this Plan, covered species such as the California red-legged frog, foothill yellow-legged frog, and California tiger salamander may be affected by implementation of the Three Creeks Conservation Program.

The Three Creeks Conservation Program is still under development by SCVWD; thus, while this Plan provides coverage for covered species that are affected by the activities described below, the discussion of these activities are at a programmatic level. Once the Three Creek HCP Conservation Program has been adopted the range of activities and impacts will be better understood. Therefore, for specific project impacts that cannot be evaluated, coverage under this Plan would be conditioned upon additional review and approval by the Wildlife Agencies (see Section 8.7.3). The covered activities are described to encompass as much of the activities in the Three Creeks HCP Conservation Program as is currently expected to occur.

The proposed Three Creek HCP Conservation Program includes seven components that will receive take coverage under this Plan.

- Geomorphic Rehabilitation
- Alamitos Creek/Almaden Reservoir Fish Passage
- Gravel Enhancement
- Reservoir and Recharge Re-Operation
- Upper Penitencia Creek Management Program
- Supplemental Flow Program
- Monitoring Program

Geomorphic rehabilitation, Almaden Reservoir fish passage, and the in-stream enhancement program are discussed generally below. Reservoir and recharge re-operation, Upper Penitencia Creek management, supplemental flows, and monitoring are described in Section 2.3.4 *In-Stream Operations and Maintenance* subheading *Three Creeks HCP Conservation Program Operations and Maintenance Actions*.

All construction-type projects will require heavy equipment including but not limited to bull dozers, dump trucks, excavators, backhoes, water trucks, welding equipment, concrete laying equipment, paving equipment, drilling rigs, and other similar equipment. Construction may include transport and use of rock, other soils, concrete, and metals. Following construction, these facilities will require on-going and periodic maintenance similar to the maintenance of recharge facilities described in this chapter.

Geomorphic Rehabilitation

Geomorphic rehabilitation is proposed in the Three Creeks HCP Conservation Program. Under this activity, certain reaches of study area streams below the reservoirs would be substantially modified to improve fish passage. Enhancement may include physical re-configuration of channels, installation of structures to enhance channel complexity (based on CDFG and NMFS guidelines for salmonid habitat enhancement), and riparian planting. Specific projects may include the following.

- Ogier Ponds separation from the channel.
- Coyote Percolation Pond separation from the channel.
- Channel enhancements the Coyote Canal diversion to downstream of Pond 10b, including separation of the channel from Pond 10b.

- Geomorphic rehabilitation in the Coyote Creek Watershed below Anderson dam. Geomorphic rehabilitation entails implementation of actions to enhance the channel for the benefit of anadromous fish (e.g., channel complexity, shading, etc.).
- Geomorphic rehabilitation in the Guadalupe River Watershed below Calero, Almaden, and Guadalupe dams. Project sites include Guadalupe dam to downstream of the Alamitos diversion dam and the upstream end of Almaden Lake to the confluence of Alamitos Creek and Guadalupe Creek.

Upon completion of project construction, sites will be monitored to ensure the actions are successful. If actions are not successful, adaptive management actions may be applied. All actions related to construction, monitoring, and adaptive management are covered activities under this Plan.

Alamitos Creek/Almaden Reservoir Fish Passage

SCVWD proposes to improve steelhead passage to upstream habitat. One of the goals of this program is to isolate juvenile salmonids emigrating downstream from the lake due to threat of predation. SCVWD has not yet identified preferred approaches to achieve these goals. If selected, trapping fish below the dam would require construction of a fish collection facility at the base of the dam. Fish may also need to be conveyed around the reservoir as they migrate downstream. If selected, this option would require construction of a collection facility on Twin Creek, a tributary of Almaden Reservoir. Under this option, SCVWD would construct an operable dam to divert juveniles from the channel to a collection facility. This location would also likely be the site to release adults migrating upstream that were trapped below the dam and trucked around the reservoir.

Because a design has not yet been identified for this project, coverage under this Plan is conditioned upon additional review and approval by the Wildlife Agencies. For the purposes of the impact analysis, a scenario with the greatest impacts to the covered species (i.e., full construction of a new fish ladder and associated facilities in non-developed land cover types) is discussed in Chapter 4 *Impact Analysis and Level of Take* and provided in **Tables 4-5a and 4-5b.** In addition, SCVWD will apply all applicable avoidance and minimization measures as described in Chapter 6 when implementing a fish passage projects.

Gravel Enhancement Program

Installation of gravel traps in the upstream reaches of Coyote, Anderson, Almaden, and Guadalupe reservoirs (below the high-water line) are proposed. The traps are needed to sort and wash gravel to remove fine sediments to improve spawning habitat for native fish. Washed gravel would then be transported to locations beneficial to fish habitat. Excavation may occur a maximum of one time per year per gravel trap if needed, but is expected to generally occur once every 3 years per gravel trap. The need to conduct excavation depends on the number of storms in a given season, how much gravel comes out of the watershed, and the need for gravel enhancement in downstream locations. Excavation will occur in the summer when the reservoir level has dropped below the location of the gravel trap such that the gravel trap will be dry. If excavated gravel needs to be stockpiled, placement will avoid sensitive natural communities such as wetlands and serpentine grassland. Whenever possible, existing access roads will be used to transport gravel from the excavation sites to processing facilities in the respective downstream watershed.

The following locations are being considered for the gravel enhancement program. One or more of these locations are expected to be selected:

- Anderson Dam to below Coyote Percolation Pond
- Almaden Dam to Lake Almaden
- Guadalupe Dam to the confluence with Alamitos Creek
- Camden Avenue Drop Structure downstream to the confluence with the Guadalupe River

In-Stream Cover Enhancement

In-stream habitat improvements may be undertaken that may include localized installation of boulders, large woody debris, or biotechnical treatments along stream banks to improve cover and riparian functions for salmonids. Activities may also include removal of exotic vegetation and replanting with native riparian vegetation. To implement these improvements, short reaches of channel may require dewatering and bypass of flow around the construction points. For the purposes of the Habitat Plan impacts analysis, a total of 1 mile of stream is assumed to be enhanced with in-stream cover.

Fish Passage Enhancement

The activity incorporates an on-going program to remove small physical and hydrologic barriers to movement of salmonids and other fish and wildlife. Activities include replacement of small culverts with bridged weir structures to provide access to tributary streams. To implement these improvements, short channel segments may require temporary dewatering or bypass to allow construction.

Use of heavy equipment such as bulldozers, dump trucks, excavators, backhoes, water trucks, welding equipment, concrete laying equipment, paving equipment, and drilling rigs may be necessary for these activities.

Dam-Related Capital Projects

Dam Seismic Safety Retrofit

As discussed above in this chapter, SCVWD operates eight large dams and three small flashboard dams in the study area. This Plan covers the retrofit of four SCVWD dams (Almaden, Anderson, Calero, and Guadalupe dams). Other Permittees, including County Parks, and the City of San José, also operate smaller dams. County Parks operates six smaller dams; five on Grant Lake at Joseph D. Grant County Park, and one on Sandywool Lake in Ed R. Levin

County Park. The City of San José operates Cherry Flat Reservoir. All of these dams are operated under regulation by the California DSOD, a division of the California Department of Water Resources. In addition, Anderson Dam is also regulated by the Federal Energy Regulatory Commission (FERC). DSOD and FERC periodically inspect and evaluate the safety of dams based on current seismic safety standards for the design of dams. If either regulatory agency determines that an existing dam does not meet current safety standards, DSOD or FERC may require either dam retrofit or reduction of the level of water in the reservoir to increase freeboard, thus reducing storage capacity.

As dams within the study area age and as safety design standards become more rigorous, it is likely that several regulated dams in the permit area will require seismic retrofitting within the permit term of the Plan. Retrofitting would not require full reconstruction of the dam, but may require extensive upgrades to dam infrastructure such as intakes or outlets. Retrofitting includes the addition of new fill or features to stabilize a structure, with the existing structure remaining either mostly or somewhat intact. Common approaches to retrofit of earthfill and rockfill dams are described briefly below. These approaches can be used individually or in combination for a specific dam.

- **Strengthening the upstream embankment.** Requires raising the dam and increasing the size and slope of the upstream embankment;
- **Strengthening the downstream embankment.** Requires raising the dam and increasing the size and slope of the downstream embankment; raising the dam and bracing the lower portion of the dam with a "bench" or “berm”; and buttressing the embankment.
- **Strengthening the dam internally.** Installing concrete-type cores in the dam to prevent rupture of the internal zone of the dam and seal the foundation.

Given the age of dam facilities, the length of the permit term, and the potential for major seismic events in the Plan study area, it is reasonable to anticipate that some substantial safety retrofits will be required for each of SCVWD’s and County Park’s dams. Upgrading of dam embankments to meet DSOD-mandated safety standards (safety retrofit) may involve upstream and/or downstream extension of embankments, dewatering of the reservoir (for any safety retrofit requiring work on the upstream embankment), increases in embankment height to increase reservoir freeboard, and reconstruction of the dam face and associated facilities such as spillways and inlet-outlet facilities. For the purposes of the impact analysis described in Chapter 4, it is assumed that four of SCVWD’s eight dams in the permit area, the six County Park dams listed above, and the City of San José’s Cherry Flat Dam will require retrofit during the permit period.

SCVWD Dams

Because there are many construction options related to dam seismic safety retrofits, some limitations were identified to qualify for coverage under this Plan. These limitations were developed to allow for reasonable description of the impacts and also to limit the impacts to covered species. The following activities are not covered by this Plan.

1. Seismic retrofit work that is conducted outside of the footprint assessed in the impact analysis (**Table 4-5a**)[11].
2. Dewatering events longer than 2.5 years at all reservoirs except Anderson for safety seismic retrofit which will not exceed 3.5 years (dewatering events are further described in the following section).
3. More than one dewatering event at a time conducted per watershed (this includes dewatering required for retrofit and dewatering required for activities described under *SCVWD Dam Maintenance Program* below).
4. More than four dewatering events for seismic retrofit (at Almaden, Anderson, Calero, and Guadalupe reservoirs).
5. More than 14 additional dewatering events for other maintenance activities (at all covered SCVWD dams; described below under *SCVWD Dam Maintenance Program*) over the permit term.
6. New earth or rockfill dams.
7. Expansion of design storage capacity or increase in the reservoir surface level as designed (i.e., no additional area of inundation; the crest of the dam might be raised to increase freeboard, but not to increase storage).
8. Dewatering rates inconsistent with **Table 2-4**[12].

The schedule for each dam seismic safety retrofit is not known at this time. Retrofits on dams that are currently operating under DSOD/SCVWD interim storage restrictions will be initiated according to DSOD requirements and funding constraints. Retrofits will encompass other major dam repairs, including dam outlets and spillways.

Retrofitting four of the eight dams in the permit area operated by SCVWD (all dams except Vasona, Coyote, Chesbro, and Uvas dams), including a dewatering event that is required as part of retrofitting, is a covered activity under this Plan. An increase in existing reservoir size (i.e., increasing the area of inundation or design capacity) is not covered by this Plan.

Borrow Sites

Borrow sites are locations where earth and rock material are removed for construction purposes elsewhere. The materials needed for dam seismic safety retrofits will vary substantially, depending on the type of retrofit. For all retrofits except concrete-type grouting and similar methods, retrofits will require substantial quantities of earth fill and/or rock fill materials including sedimentary soils, rock of various sizes, and concrete. The quantities, quality, and type of materials needed depend on the specific design of the retrofit; materials must meet rigid performance standards in order to ensure safety.

[11] Because the specific retrofit method for each dam was not known at the time of the impact analysis, the impact analysis described in Chapter 4 and **Table 4-5a** assumes that downstream embankment strengthening would be employed for all dams because it represents the worst-case scenario.
[12] The Wildlife Agencies may require adjustments to maximum flows in **Table 2-4** for future projects based on monitoring results (see *Dewatering Event*) below.

To address this fill requirement, SCVWD will consider obtaining fill from a number of sources, including the following.

- The upstream delta of the reservoir.
- The reservoir.
- Existing quarries.
- New quarries in the reservoir basin, in the canyon below the dam, and in the alluvial plain within the Habitat Plan permit area.

Although SCVWD will prefer to obtain materials from sites near the dam and sites with a low potential for impacts to covered species and their habitats, borrow materials must meet engineering criteria for the dam seismic safety retrofit and this requirement will necessarily limit sources for borrow. SCVWD will use the following criteria to avoid and minimize impacts.

- Use fill from the reservoir delta and basin to the extent feasible.
- Select borrow sites based on general feasibility criteria such as suitability of materials, haul distance, cost, and potential impact to covered species. If two or more potential borrow sites are capable of providing materials that meet geotechnical requirements, select the site with the lowest potential for impacts to covered species.
- Avoid wetlands.
- Avoid sites in areas designated as high or medium conservation priority in this Plan.
- Avoid sites within designated habitat preserves.
- Select haul routes to minimize the potential for traffic to impact special status plants and animals.

Borrow sites will not be located directly in streams or immediately adjacent to streams such that permanent stream impacts would occur, except where the stream is also in a reservoir (consistent with the first bullet above). The following worst case assumptions were used to define the maximum allowable impact covered by this Plan.

- Earth fill will be obtained from locations in the alluvial plain in the north valley area.
- Earth fill excavations will range from 30 to 40 feet deep.
- The side slopes of the borrow pits will be 1 (vertical) to 2 (horizontal) and would add 10% to the permanent impact area.
- The area of temporary impact around borrow areas will equal 30% of the area of excavation.
- Rock fill will be obtained from within the reservoir.

Following use of a borrow area in the alluvial plain, SCVWD may use the site as a recharge area (if it is appropriate for recharge) or it may be converted to other uses such as recreation and environmental enhancement.

Borrow sites developed to support reconstruction of dams in the Habitat Plan study area are expected to be located inside of the permit area of the Habitat Plan. Take associated with borrow sites located in the portion of the proposed Three Creeks HCP permit area that does not overlap with the permit area of the Habitat Plan are possible but are not covered activities under the Habitat Plan and would require authorization through the Three Creeks HCP or another regulatory mechanism. Selection of borrow sites located inside the Habitat Plan permit area covered by the Habitat Plan are subject to Wildlife Agency review and approval during implementation of the Plan (see Section 8.7.3 *Wildlife Agency Responsibilities*).

Dewatering Event

Prior to dam seismic safety retrofit, a reservoir must be dewatered. Once emptied, the reservoir is maintained free, or almost free, of water until construction is completed. The reservoir refills the following winter. In the case of a drought, refilling could take longer. The time between the beginning of reservoir dewatering and when the reservoir is re-operated according to applicable rule curves[13] is called a *dewatering event*. SCVWD expects that up to four dewatering events will be required for safety retrofit of the four SCVWD dams covered for this activity. Four dewatering events are associated with seismic safety retrofits, but multiple dewatering events could occur at a single dam over the permit term. In addition, SCVWD anticipates dewatering may be required for some maintenance activities. These activities are discussed in Section 2.3.4 *In-Stream Operations and Maintenance* subheading *SCVWD Dam Maintenance Program.*

Each SCVWD dewatering event is covered under this Plan for up to 2.5 years except at Anderson Reservoir for implementing a seismic safety retrofit. It is expected that Anderson Dam will require two seasons to reconstruct and thus requires 3.5 years for a dewatering event. If SCVWD anticipates a dewatering event will take more than 3.5 years for seismic safety retrofit at Anderson Dam or more than 2.5 years for any dewatering event at other dams, SCVWD will begin a separate consultation process with USFWS and CDFG and may be required to provide additional mitigation beyond that required by the Habitat Plan.

Timing of a dewatering event varies from reservoir to reservoir due to capacity constraints of each dam's outlet system. However, draining a reservoir generally takes months. Construction will be planned so that the reservoir is ready to begin receiving water again in November after construction or maintenance is completed. The reservoir refilling begins during the following (second) season. The amount of time the reservoir requires to refill depends largely on the weather and if the reservoir is a storage facility for imported water. See **Table 2-4** for

[13] There are multiple types of rule curves by which SCVWD operates its reservoirs and not all of them are for species conservation purposes.

maximum covered release flows from reservoirs for the draining phase of dewatering events.

Before a reservoir is dewatered for the first time (whether for dam seismic safety retrofit or other dam maintenance described in Section 2.3.4 below), SCVWD will prepare a reservoir-specific dewatering plan to minimize impacts to covered species (in particular, California red-legged frog and western pond turtle). This plan will be submitted to the Wildlife Agencies for review and approval[14]. Dewatering plans will be updated prior to subsequent dewatering events during the permit term in the event that a single reservoir is dewatered more than once. Dewatering events involve the following components.

- **Draining.** A period generally between 6 months to 1 year of reservoir releases in excess of then-current flow targets. The SCVWD will specify the timing, frequency, and duration of reservoir releases in each dewatering plan.

  Maximum covered release flows were developed to be higher than the flows which will be implemented by SCVWD and are provided as a maximum flow releasecovered by the Plan.

  If, at the time of developing a dewatering plan, SCVWD determines the flow releases will be higher than those in **Table 2-4**, additional consultation with the Wildlife Agencies will required and additional mitigation may also be required.

  The effects of stream flow regulation on amphibians and reptiles are poorly understood. If California red-legged frog western pond turtle, or 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 (including dewatering events) on the species as specified in (Section 7.3.3 *Species-Level Actions*). Effects of draining will be documented and reported to the Wildlife Agencies within 60 days of the conclusion of each dry season and wet season dewatering event. After coordinating with the Implementing Entity, the Wildlife Agencies may require an adjustment in the maximum reservoir release flows in **Table 2-4**. For example, if targeted studies show that maximum reservoir release flows allowed during the wet season scoured a significant amount of California red-legged frog egg masses, the Wildlife Agencies may require that the maximum covered reservoir release flow be decreased from those currently specified in **Table 2-4** for future projects on that facility. Conversely, if monitoring data suggests that reservoir release flows described in **Table 2-4** are not having adverse effects on covered species, flows may be increased with Wildlife Agency approval.

- **Construction/repair.** A period of about 6–8 months when the reservoir will be dry, and natural inflow and groundwater upwelling will be bypassed around the dam for release to the downstream channel. The entire footprint

[14] Chapter 6, Condition 4 *Avoidance and Minimization for In-Stream Projects*, subheading *Requirements for SCVWD Dewatering Events* requires a dewatering plan to be approved by the Wildlife Agencies. Condition 4 also identifies the minimum required content of a dewatering plan and avoidance and minimization measures that may be applied. See Chapter 8, Section 8.7.3, subheading *Additional Review* for details of the review process.

of the dry reservoir may or may not be continuously disturbed during this time.

- **Refilling.** A period when the reservoir is re-filling and downstream flow may be limited to a combination of bypass flow and supplemented flow (if supplemental flows are provided) because water levels have not yet reached the elevation of the outlet and to allow the reservoir to fill as rapidly as possible. If there is a dry year following construction/repair, then the period of re-filling may extend beyond one winter season.

Construction and operation of supplemental water supply systems that may be implemented as a covered activity during dewatering events is discussed below under *Three Creeks HCP Conservation Program Operations and Maintenance Actions*.

County Parks Dams

County Parks anticipates that each lake may require dam retrofit once within the permit term. Up to one dam at Sandywool Lake and up to five dams at Grant Lake may be retrofitted during the permit term. The existing dams are earthen dams. The dam at Sandywool Lake has rip rap armoring to protect from erosion related to wave action. Dams will be reconstructed within the same footprint of the existing dam and will remain earthen unless DSOD requires alternative materials. Repair or maintenance may include embankment strengthening on the downstream side of the dam.

These dams are considerably smaller than SCVWD dams and each dewatering event (i.e., draining, construction, and refilling) is expected to take up to 3 months, although it could be as little as 1 month. Construction will occur during the summer. Lakes will require dewatering prior to construction activities. Work will be performed when each lake is at its lowest level. Sandywool Lake is fed by a pipe from Calaveras Reservoir. Inflows would be shut off at the inflow valve and, through use of reservoir water for irrigation, the water level of the lake allowed to dewater below the level necessary to perform the construction. It is expected that a small pool will be maintained in the lake during construction to support irrigation of park turf and golf courses. Sandywool Lake feeds a small tributary to Arroyo de los Coches, a tributary to Berryessa Creek. While Sandywool dam does have a spillway to Arroyo de los Coches, it does not have outlet valve and does not provide annual flow to local streams. Thus, dewatering is not expected to affect the water supply for local streams.

Grant Lake is fed by overflows from McCreery Lake via a historic canal system. Dewatering would occur by pumping because the lake has no outlet valves. The lake would be dewatered only to the level required to perform the work and a minimal pool will be maintained. Because Grant Lake only receives overflow from McCreery Lake, and McCreery Lake only overflows during winter storm events, no inflows to Grant Lake are expected during the construction period. Grant Lake is not located on a stream, but it does have a drainage connection to Arroyo Aguaque Creek, a tributary to Upper Penitencia Creek, via the dam’s spillway. Dewatering is not expected to affect the water supply for local streams.

Both lakes would refill naturally the following winter and through the existing systems supply systems.

Because these reservoirs are relatively small and downstream water supplies are not expected to be affected, dewatering plans for review by the Wildlife Agencies are not required.

Borrow sites will be sited in the California annual grassland land cover type or in other already disturbed areas. Whenever possible, borrow sites will be used to create habitat for covered species (e.g., a pond for California tiger salamander). Location of borrow sites will be within County parks, but exact locations are unknown at this time. Borrow sites will be subject to Wildlife Agency review and approval during implementation of the Plan (Section 8.7.3 *Wildlife Agency Responsibilities*).

City of San José Dam

The City of San José anticipates that the dam at Cherry Flat Dam may require safety retrofit within the permit term of the Plan. Similar to the County Parks dams, this dam is much smaller than the dams maintained by SCVWD. The dewatering event (i.e., draining, construction, and refilling) is expected to take up to 4 months, although it could be as little as 1 month. The reservoir will require dewatering prior to construction activities. Cherry Flat Reservoir is located on Upper Penitencia Creek. This reservoir is not currently managed to support fish flows in Penitencia Creek, although it is managed to maintain minimal flows through Alum Rock Park (approximately 0.5 cfs) during summer months. Reoperation of the reservoir for fish management is included as a conservation measure in the proposed Three Creeks HCP Conservation Program (described below). Because this reservoir is relatively small, a dewatering plan for review by the Wildlife Agencies is not required.

Cherry Flat Reservoir receives water from the upper watershed of Upper Penitencia Creek. The watershed above the reservoir is relatively small (2.4 acres). During a wet year, the reservoir may refill in one season. It may take more than one winter to refill the reservoir during drought conditions.

The borrow site for this project will avoid sites in areas designated as high or medium priority for conservation in this Plan. Borrow sites will be subject to Wildlife Agency review and approval during implementation of the Plan (see Section 8.7.3 *Wildlife Agency Responsibilities* for details).

Dam Instrumentation Project

SCVWD's Dam Instrumentation Project is a capital project that requires installation of new instrumentation at the eight dams in the permit area. This includes the installation of piezometers, inclinometers, survey monuments, real-time monitoring systems, seepage collection systems, reservoir level gauges, and seismographs. Activities also include a field geotechnical exploratory drilling pr*ogram and providing a corresponding* Automated Data Acquisition System for the eight SCVWD dams within the study. Installation of equipment and exploratory drilling may require access road grading and restoration, drilling, trenching, excavation and backfilling, electrical work, supervisory control and data acquisition (SCADA) system work, and concrete work.

Guadalupe, Anderson, Vasona, Calero Auxiliary dams currently do not have seepage collection systems installed but will likely require such systems to be installed within the permit term. These new systems would be installed within the footprint of the Dam Maintenance Program (described below under *In-Stream Operations and Maintenance*). In addition, any dam that is seismically retrofitted in a downstream direction would require installation of a seepage collection system, although this system would be installed within the footprint of the retrofit.

The work will occur within the identified Dam Maintenance Program footprints and many of the activities associated with this task are also conducted as part of the Dam Maintenance Program. Most of these activities will be conducted on the dams and, to a lesser degree, on the abutments. There is the potential for impact to non-developed land cover. However, because these activities are conducted in the footprints of the Dam Maintenance Program, no additional impacts are assessed for implementation of the Dam Instrumentation Project. Maintenance of dam instrumentation is discussed below in Section 2.3.4 *In-Stream Operations and Maintenance* subheading *Dam Maintenance Program*.

In-Channel Groundwater Recharge Facilities

The following two projects involve rehabilitation and expansion of off-channel groundwater percolation ponds and associated diversions facilities. These systems require: 1) an in-channel diversion dam that pools water, 2) an outlet structure to transport water from the stream channel to the pond, and 3) an off-channel groundwater recharge pond. To provide flow to the off-channel ponds, an in-channel dam is constructed. Historically, this may have included a gravel berm placed across the channel annually, or a permanent in-channel structure. New or replacement temporary diversion structures placed under this Plan will consist of operable (inflatable) dams that can be deflated during times of year when fish passage is most critical. A diversion (outlet pipe or canal) is constructed upstream of the dam in the pool. When water backs up behind the dam, gravity moves water from the pool into the diversion and then into the off-channel percolation pond.

Ford Road Groundwater Recharge Pond and New Diversion Dam at Metcalf Road

SCVWD may propose re-operation of the existing off-stream Ford Road Pond, and expand the site to include up to three additional ponds (for a total of four ponds). Re-operation would only include the existing pond, not the in-channel diversion that was once used to provide flows to the pond. The project site is located between U.S. 101 and Hellyer Avenue, south of Piercy Road and immediately north of the Coyote Creek Trail, adjacent to Coyote Creek. The project site is approximately 19 acres, including the existing off-channel pond.

As a result of isolating Ogier and Coyote recharge ponds from the main channel of Coyote Creek (a covered activity identified above under *Three Creeks HCP In-Stream Capital Projects*), the area of on-channel percolation will be reduced and SCVWD may need to install a new diversion facility to move flows to off-channel recharge ponds in order to maintain the same level of water diversion to the groundwater basin. If needed, this new diversion would be installed along Coyote Creek at Metcalf Road. In addition, a new pipeline would be constructed that would provide water to the newly isolated Coyote recharge pond and the new Ford Road ponds (both ponds will be served by one diversion and pipeline). The diversion facility may require a seasonal operable (inflatable) dam to create an in-channel ponded area to provide flows to the diversion. If utilized, this dam would also include a fish ladder. Design of the diversion will be coordinated with CDFG for issues related to anadromous fish impacts and because this project will require a streambed alteration agreement. Impacts evaluated in Chapter 4 assume the worst case that a new operable dam, diversion, and pipeline will be installed.

Reoperation of Ford Road ponds is not expected to change flows downstream of the Coyote recharge pond/Ford Road pond complex. If, when the project is ready to be implemented, SCVWD identifies a change in downstream flows due to re-operation of Ford Road pond that may affect the covered species, additional consultation with the Wildlife Agencies will be required that may result in additional minimization and/or mitigation measures.

Church Avenue Groundwater Recharge Ponds

SCVWD may propose the re-operation of off-stream Church Avenue Ponds. The Church Ponds consist of three ponds located on 57 acres near the intersection of Llagas Avenue and Church Avenue in San Martin. The ponds border the west side of Llagas Creek and are separated from the creek channel by a levee. The ponds have a total surface area of 42 acres. One percolation pond is located directly north of Church Avenue, another pond directly south of Church Avenue, and the third pond is located southeast of the pond south of Church Avenue. The project requires replacement of the existing in-channel diversion along Llagas Creek to supply water to the pond. The final design has not yet been determined, but it may include installation of an operational dam (i.e., inflatable rubber dam) with a permanent fish ladder structure. Design of the diversion will be coordinated with CDFG to address issues related to anadromous fish impacts and to meet the requirements of a streambed alteration agreement.

As described in *In-Stream Operations and Maintenance* subheading *Proposed Operating Rules for Water Supply Facilities in the Uvas and Llagas Watersheds*, Church Avenue Ponds will divert flows from Llagas Creek when reservoir capacity allows, consistent with fish flow and on-channel recharge requirements. Reoperation of Church Avenue ponds is not expected to change flows downstream of the Church Avenue pond beyond that anticipated in *In-Stream*

Operations and Maintenance subheading *Proposed Operating Rules for Water Supply Facilities in the Uvas and Llagas Watersheds*. If, when the project is ready to be implemented, SCVWD identifies a new change in flow that may affect the covered species, additional consultation with the Wildlife Agencies will be required that may result in additional minimization and/or mitigation measures.

New Bridge Construction and Replacement/ Rehabilitation

All of the Local Partners operate and maintain bridges within the study area. For example, VTA maintains approximately 10 light rail bridges in San José. The lifespan of a typical bridge is approximately 50 years. Therefore, over the course of the 50-year permit term, it is expected that every bridge within the permit area will likely need major repair or replacement. Similarly, as development within urban areas progresses, new bridges will likely need to be constructed. New and rehabilitated bridges will be designed to federal and state guidelines at the time of construction. In most cases, reconstructed bridges will be wider than the bridges they replace in compliance with changing regulations. Some roads may be widened to accommodate growth in vehicular traffic, bicycles, and pedestrians. Road widening will require adding imported borrow and new asphalt, concrete, and aggregate base for pavement. Where structurally and financially feasible, bridges will be constructed as free-span bridges. Where free-span bridges are not feasible, bridges will be built on pile foundation, cast-in-drilled-hole pile, or spread footing foundations. Excavation for foundations may be required. Slope paving will be included in the scope of work to protect/improve channel slopes at the bridge. County road projects that occur at a stream crossing with a span less than 20 feet are almost always designated as a culvert (D. Cameron pers. comm. a). When culverts are installed, they will be designed and constructed to pass a 100-year flood event as described in Chapter 6. Major bridge repair and rehabilitation may be similar to bridge replacement in scope, often requiring roadway widening, new deck support structures, and seismic retrofitting. The construction of up to 270[15] new bridges, as well as repair and replacement, including expansion, of all existing bridges within the permit area one time during the permit term, is a covered activity of this Plan.

Streamside Trails and Crossings

Several of the Local Partners and the Open Space Authority lead or participate in programs to install trails. New trails are sited outside of the in-stream area to the extent possible to avoid affects on riparian vegetation and streams. However, some trails will need to cross streams and will require installation of bridges or other types of crossings. Trails may also be implemented as a component of

[15] This includes rural residential development but does not include non-bridge creek crossings installed by County Parks along single-track trails.

other types of projects such as flood protection projects or levee reconstruction. In such cases, trails will generally be sited along maintenance roads or in other disturbed areas and will not result in additional impacts beyond those attributed to the main project. The Clean, Safe Creeks and Natural Flood Protection program described above is one such program that supports development of trails into other projects. Streamside trail projects will be a covered activity under this Plan. For more details on trail projects as a covered activity, please see Section 2.3.5 *Rural Capital Projects*.

2.3.4 In-Stream Operations and Maintenance

Activities within streams are those activities or projects that occur in or immediately adjacent to streams and adjacent riparian vegetation that may result in impacts on a stream or canal. This may include activities at dams, reservoirs, and on-stream ponds. This category includes operations and maintenance activities in the stream channel, along the stream bank, and adjacent lands at top-of-bank within the riparian corridor, including maintenance of access roads and trails. These covered activities occur in both urban and rural areas. This section discusses operations and maintenance activities in or adjacent to streams.

Facility and Stream Maintenance

The majority of identified operations and maintenance activities within and adjacent to streams are undertaken by SCVWD, which is responsible for maintaining its facilities. As described earlier, SCVWD is responsible for approximately 35% of the linear distance of all streams within the permit area. As described below, activities conducted by SCVWD under its Stream Maintenance Program are not covered by this Plan and its permits. Specific activities conducted by SCVWD covered under this Plan are described in detail below. Other Permittees also conduct activities within streams, often on properties they own separately. For example, County of Santa Clara Department of Parks and Recreation is responsible for routine maintenance within County parks, including properties leased by the County for parks. The Cities of San José, Gilroy, and Morgan Hill also maintain some stream segments within their jurisdictions. The following operations and maintenance activities within streams are covered by this Plan. Most of the activities listed below will be conducted by the cities, County Parks, the Open Space Authority, and County Roads and Airports Department for stream segments not maintained by SCVWD through the Stream Maintenance Program.

- Facility maintenance such as trail repair; trash removal; installation of fences; accumulated sediment removal (see following section for additional discussion); trail, road, and culvert repair or replacement; and minor bridge repair.
- Storm system maintenance including clearing outlets in order to ensure unrestricted storm water flow. Work may entail trimming vegetation and/or clearing sediment around drain outlets.

- Storm damage repair and flood prevention projects including drainage improvements.
- Natural resource protection such as small bank stabilization projects (less than 100 feet), restoration to reduce erosion, and removal of debris deposited during flooding.
- Small-scale erosion control projects or storm damage prevention projects that do not create new permanent hardscape on the creek bank or channel. This category includes temporary flood-fighting activities to prevent storm damage (e.g., sandbagging).
- Operation and maintenance of flood protection facilities such as armored creeks, bypass channels, levees, access roads, and detention ponds.
- Fish screen installation and removal of fish barriers such as in-stream concrete low-flow crossings and culverts.
- Vegetation management for exotic species removal, such as removal of giant reed, and planting of native vegetation.
- Vegetation management for public safety hazards including fire management and mosquito control activities.
- Stream gauge station maintenance upstream of reservoirs.
- Operations and maintenance of water utility/water supply facilities including flashboard or inflatable dams, diversion structures, groundwater recharge ponds, gauges, pipeline blowoffs, turnouts, drop structures, weirs, fish ladders, etc.
- Sediment removal, including mercury remediation incidental to the sediment removal.

Operations and maintenance activities associated with habitat enhancement and restoration that will be conducted inside and outside the Reserve System are identified in Section 2.3.8 *Conservation Strategy Implementation*.

Sediment Removal and Mercury Remediation

Removal of accumulated sediment is a covered activity under this Plan. Due to historic mining practices in some portions of the study area, sediment in some of the streams in the study area (e.g., Guadalupe River and its tributaries) may contain detectable levels of mercury. Current regulations require that sediment be tested for contaminants, including mercury, before it is used elsewhere in the watershed or distributed to a landfill. Sediment that tests positive for mercury will be disposed of in a hazardous materials facility. Although mercury remediation is undertaken through some sediment removal projects, mercury remediation is not the primary goal but rather a result of proper and regulated sediment disposal. Sediment removal activities undertaken as part of routine stream maintenance that also remove mercury from streams and are conducted by

Local Partners other than SCVWD are covered by this Plan[16]. Activities undertaken with a primary goal of mercury remediation are not covered by this Plan (see Section 2.4 *Projects and Activities Not Covered by this Plan* for additional detail).

Santa Clara Valley Water District

SCVWD has in place or is developing other permitting programs to obtain necessary incidental take permits for operation and maintenance activities. In 2002 SCVWD received permits to implement the Stream Maintenance Program which provides ESA coverage for routine stream maintenance (see Section 2.4 *Projects and Activities Not Covered by this Plan* for additional detail). The non-routine stream maintenance activities described below are covered only by this Plan. As discussed above, SCVWD is also currently developing the Three Creeks HCP. Certain activities covered under the Three Creeks HCP are also covered by this Plan as described in this chapter. SCVWD is also currently developing a Dam Maintenance Program (described below). Implementation of the Dam Maintenance Program is a covered activity under both the Three Creeks HCP and the Habitat Plan as pertains to their respective study areas (**Figure 2-5**).

Reservoir Operations under DSOD Interim Storage Restrictions

As discussed above in Section 2.3.3 *In-Stream Capital Projects*, SCVWD and the DSOD regularly evaluate the status of SCVWD dams to ensure their continued safety. If a potential safety concern is identified, SCVWD reduces storage until the concern can be addressed. Known as *interim storage restrictions*, these voluntary reductions in storage affect water supply operations (management of reservoirs and ground water basins). In particular, they place an increasing emphasis on wet-season recharge so that SCVWD can capture as much inflow from storms as possible and retain as much of the reduced storage capacity of the reservoir for dry season recharge. Most of SCVWD's dams (all but Vasona, Uvas, and Chesbro) have been operating with storage restrictions for approximately 12 years.

As of December 2011, SCVWD and DSOD agreed to increased storage restrictions (additional reductions) on Anderson, Calero, and Guadalupe reservoirs. Storage restrictions were not changed for Almaden and Coyote reservoirs. No interim storage restrictions are currently in place for Vasona, Chesbro, or Uvas reservoirs. Current interim storage restrictions are shown in **Table 2-5**.

From the date that DSOD issues a storage restriction to re-operation of the reservoir post safety retrofit, the process to implement a retrofit may take several

[16] SCVWD's Stream Maintenance Program provides coverage for minor mercury remediation associated with sediment removal.

years due to design review requirements, financing, and environmental reviews; therefore interim storage restrictions are likely to be in place until SCVWD is able to implement repairs to DSOD standards (which may require seismic retrofit).

Over the last 12 years of DSOD storage restrictions, SCVWD has operated some reservoirs according to rule curves for special-status fish species, and SCVWD expects that these requirements will continue (see *Proposed Operating Rules for Water Supply Facilities in the Uvas and Llagas Watersheds* and *Three Creeks HCP Conservation Program Operations and Maintenance Actions* below). If SCVWD is not able to meet these rule curve requirements, developed in coordination with NMFS and CDFG, due to future increases in DSOD storage restrictions (including new storage restrictions on dams currently without restrictions), and dry-back in channels below reservoirs increases substantially over current conditions, then SCVWD will begin a separate consultation process with USFWS and CDFG and may be required to provide additional monitoring and/or mitigation beyond that required by the Habitat Plan.

Recharge Operations and Maintenance

In the channels below the reservoirs, SCVWD operates and maintains in-channel and off-channel recharge ponds and associated facilities. SCVWD operates and maintains the following types of facilities:

- In-channel diversion dams, diversions, weirs, and drop structures with associated fish ladders, fish screens, distribution ditches, inter-pond pipes, and recharge basins;
- Streamflow gauges and associated equipment; and
- Pipeline turnouts where water is released into creeks.

This infrastructure is entirely located downstream of reservoirs and dams, or on tributaries of reaches downstream of dams. The operation of this infrastructure may result in small levels of take of covered species and is described below. Maintenance includes inspection, cleaning, periodic sediment removal, debris removal, on-going placement and removal of flashboard panels, and similar activities. Maintenance may be required as a result of flood damage, debris damage, seismic events, or other changed or unforeseen circumstances. These facilities may be modified and may require significant redesign, refurbishment, or replacement once in 50 years. Maintenance, repair, and replacement may involve a range of activity intensities, from minor work in the channel with hand tools to more extensive work that may involve work in the channel and in adjacent terrestrial habitats using construction equipment. During refurbishment and/or replacement activities may include removal of existing structures, excavations, placement of concrete, and re-construction of structures including metal work. These activities may require heavy equipment to access and work in the channel. Permanent access roads will be constructed and maintained, and there will be hardscaped facilities on concrete pads.

Maintenance of facilities includes modification to the facilities, within the construction footprints defined, that enhance safety or operations. In three locations, SCVWD proposes to replace current flashboard dams (which cannot be operated on a daily basis) with operable dams that would allow dams to be raised and lowered on a daily basis without compromising safety. Various configurations will be evaluated. From May 1 through October 31, the operable dams would be used in a manner consistent with current practices; the ability to change dam operations on a daily basis would change operations from November 1 through April 30, when at present the dams are either removed or left in place. This shift in operations would alter hydrology during the period from November 1 through April 30 and would affect the height and configuration of the dams, the depth of ponding, and duration of ponding behind the dams.

SCVWD operates about 320 acres of off-channel and on-channel recharge basins in the Three Creeks HCP study area, and approximately 50 acres in the Uvas and Llagas watersheds. Recharge ponds are generally surrounded by levees or were converted from gravel mining operations and are partially below grade. The ponds are linked to the adjacent channels via weirs and overflow spillway or overflow standpipes and pipelines so that, when necessary, water may be discharged from the ponds to the channel. Discharges are made when inflow to the ponds exceeds the capacity of the ponds, which generally occurs when flow through the ponds is constrained by debris build up at a gate, stormwater overflow, or other problems; the pond elevation rises in response and the water flows through the overflow pipelines or over weirs to the channel. This occurs only infrequently at all locations other than Upper Penitencia Creek, where SCVWD routinely makes releases to the upper ponds from the South Bay Aqueduct and a portion of these releases is then passed through the ponds to the channel for in-channel recharge.

Ponds and associated facilities are maintained routinely; major repair and maintenance typically occurs on a 2–10 year cycle. Rodent control is conducted as needed to protect levees, pond slopes, and access roads. The levees are repaired, the ponds are drained, 2–6 inches of fine sediment on the bottom of the ponds is removed. Pond maintenance includes use of heavy equipment such as scrapers, dozers, back hoes, cranes, loaders, dump trucks, and other earth moving equipment. Spoils are removed and used as fill or disposed of outside of the area. No sediment is released to the channel. The perimeter roads are repaired and graded, the gates are cleaned and repaired, and pipelines, debris screens, and other features are repaired. Repair of facilities such as gates, pipelines, and pumps may require metal work and use of concrete, chemicals, and asphalt.

Vegetation management is also needed on properties adjacent to the percolation ponds. Aquatic vegetation must be controlled within the ponds, and buildup of algal mats must be removed to maintain percolation rates. The entire footprint of the ponds is thus routinely completely disturbed. When ponds are drained nonnative fish, reptiles, and amphibians in the ponds will be removed and disposed and native species may be relocated as described in Condition 4 (see Section 6.4.2 *In-Stream Projects* subheading *Condition 4. Stream Avoidance and Minimization for In-Stream Projects* for additional detail).

In addition to currently operational recharge areas, SCVWD is proposing to re-operate the off-stream Ford Road Pond located on Coyote Creek and Church Avenue Ponds, and to construct up to four new off-channel recharge ponds. The Ford Road and Church Avenue ponds are described above in Section 2.3.3 *In-Stream Capital Projects* and the four new off-channel ponds are described in Section 2.3.5 *Rural Capital Projects*.

SCVWD diversion dams are semi-operable; that is, they have fixed panels (flashboards) that may be removed at times, but the removal process is time consuming and both difficult and a safety concern during high flows. Removing the fixed panels is generally accomplished with a crane operating from the bank and a backhoe or other heavy equipment operating in the channel and removing the panels to the crane. In general, SCVWD removes flashboards prior to the first storm that may pose a flood threat, and the flashboards are then not replaced until the likelihood of major storms has passed. Depending on the magnitude and timing of precipitation, flashboards may be left in place year round in a dry year or, in a wet year, removed early and reinstalled late. When flashboards are removed, diversions are negligible.

Diversions dams are subject to high flows, debris damage, and general wear and tear. Diversion dams are routinely maintained and various components are replaced. It is anticipated that recharge operations facilities will be replaced, on average across all facilities, once during the permit term of the Habitat Plan. Diversion facilities may be reconstructed as operable dams. Operable dams will be either be inflatable (otherwise known as rubber dams) or will consist of panels that can be raised and lowered remotely. Inflatable dams can be operated in “real-time” during the wet season, thus allowing diversions where flooding is not a concern and for conservation purposes (e.g., flushing sediment, allowing fish passage, etc.). Replacement diversion facilities will not have a substantially different footprint (within 10%) from the existing facility nor will replacement substantially modify the maintenance footprint. Operable dams will be constructed on a sloped concrete bench that will be designed to allow fish passage when the dams are down.

Recharge operations require measurement of stream flow at various locations. This is accomplished using a system of stream flow gauges which are simple fixed structures set across the channel. Operation of these gauges involves routine inspection and repair, a relatively low impact operation. Replacement of such small facilities involves more intensive construction work, as described for all facilities above. SCVWD may also install up to 10 new stream gauges to ensure proper management of stream flows. SCVWD has also installed a number of drop structures which are part of the program to reduce flood potential. These can range from vertical concrete walls or stepped facilities. Drop structures are laddered to promote fish passage at some locations. Finally, SCVWD has release valves for a number of pipelines along the channels which function as release points to drain pipelines during maintenance and/or when pipeline pressure increases and must be relieved to avoid pipeline damage. These "blow-off valves" may need routine maintenance. This routine maintenance is also part of the Pipeline Maintenance Program described below under Section 2.3.6 *Rural Operations and Maintenance*.

SCVWD releases imported water at stream turnouts for flow augmentation to Coyote Creek from the Santa Clara Conduit, Los Gatos Creek from the Central Pipeline, and Calero/Alamitos/Guadalupe Creeks from the Almaden Valley Pipeline.

Maintenance work associated with pipelines is part of SCVWD's Pipeline Maintenance Program, described below in Section 2.3.*6 Rural Operations and Maintenance*.

Proposed Operating Rules for Water Supply Facilities in the Uvas and Llagas Watersheds

SCVWD, in conjunction with NMFS, CDFG, and other local stakeholders, has developed a preliminary set of draft principles to guide operation of Uvas and Chesbro dams to benefit steelhead trout (National Marine Fisheries Service et al. 2009). Operations of these dams are considered together because Uvas and Chesbro dams have been operated in tandem and are linked through a gravity pipeline in which water from Uvas Reservoir can be transferred into Llagas Creek to supplement groundwater percolation in that watershed. The overall objective of the operating strategy is to restore and maintain healthy steelhead populations within Uvas Creek, recognizing that Llagas Creek is extremely flow-limited under most years for steelhead production.

One of the outcomes of the draft principles was a detailed set of "rule curves" to guide the operation of these dams and conservation actions implemented for the benefit of steelhead trout.[17] The rule curves identify different release rates depending on how many acre-feet of water are stored in the reservoir at a specific point in time. These curves were derived from the estimated probability of future stream flows expected on any particular date, based on a statistical analysis of historical stream flow data. In wet years, the full range of releases are available to provide for winter attraction, spring out migration (highest fisheries priority), and summer rearing for steelhead trout. Under less favorable hydrologic conditions, the rules allow for the adjustment of releases to meet the remaining flow priorities for steelhead trout. Operating rules provide for water transfers from the Uvas watershed for percolation in Llagas Creek and Church Avenue groundwater recharge ponds only when there is water to meet all flow requirements in Uvas Creek, including adequate reservoir carry over storage for releases into the next season. The modified rule curves were intended to adjust the release schedule of and between the two reservoirs, relative to the historic prescribed operation (defined by a 1956 Memorandum of Agreement with CDFG) to ensure the steelhead population management is optimized between the two systems.

These management activities may have both beneficial and adverse effects on covered amphibians and reptiles and are covered activities under this Plan.

[17] These preliminary rule curves are detailed in the *Proposed Operating Rules for Water Supply Facilities in the Uvas and Llagas Watersheds* (National Marine Fisheries Service et al. 2009). This document has not been formally adopted by SCVWD or approved by NMFS.

- **Timing of Transfers to Llagas Creek.** SCVWD may transfer Uvas Reservoir water to Llagas Creek only if winter, spring, and summer flow targets can also be met in Uvas Creek. Transfers will be delayed to late summer and fall.
- **Smolt Out-Migration.** SCVWD may provide releases from Uvas Reservoir in April and May (depending upon available water on April 1). Flows may be pulsed to improve outmigration. To maintain assurance that summer flows can be met in Llagas Creek, no outmigration pulses of reservoir storage will be made to Llagas Creek from Chesbro Reservoir. Local seasonal runoff and flood management releases will be the source of pulse flow and hydraulic connectivity.
- **Summer and Fall Releases.** Releases of about 14 cfs from Uvas Reservoir maintain flows downstream to about West Luchessa Avenue (with about 2 cfs flow at Miller Avenue). These releases are able to be percolated into the groundwater basin for water supply. Releases greater than 14 cfs usually extend the flow further downstream to areas where percolation does not enter the groundwater basin for use as future water supply. However, the extent of wetted channel produced by different reservoir releases varies with season, due to accretion by tributary and groundwater inflow, transpiration use by riparian and terrace vegetation, and extent of groundwater pumping. Releases can vary with accretion, so that rearing flows are maintained to a specific point on the stream (target is West Luchessa Avenue). Releases will be increased or decreased as necessary to maintain a live stream to that point, rather than providing a constant release that would result in early and late season expansion of the wetted zone and late summer dry backs to a significant portion of the channel.

  Releases from Chesbro Reservoir will maintain summer and fall flow downstream to about the Church Avenue percolation facilities. These releases are able to be percolated into the groundwater basin for water supply and maintain a consistent extent of wetted creek for fish during the dry summer months. If reservoir storage is available an additional release or diverted volume can augment flow, in-stream and be diverted into the Church Avenue percolation ponds. The Church Avenue off-stream recharge diversions will be adjusted as necessary to maintain the maximum the extent of flow between the dam and the Church Avenue percolation facilities. All releases are managed by a set of operational priorities that seek to maintain a consistent and sustainable maximum flow extent during the dry summer for fisheries management and water supply.
- **Rearing Habitat Quality.** If storage in Uvas Reservoir is sufficient, SCVWD may maintain summer and fall (June–December) stream flow to West Luchessa Avenue. The extent of wetted stream channel and the flow to the Church Avenue diversion may be reduced compared to the historic channel conditions based on the reduced amount of water available for transfer from Uvas. Augmented flows from Chesbro that are maintained to the Church Avenue percolation facilities and diverted off-channel for groundwater percolation will maintain improved stream conditions relative to flows that only make it to Church Avenue.

- **Winter Attraction Flows.** If rule curves indicate sufficient water, SCVWD may provide for periodic winter pulse releases from Uvas Reservoir of in each winter month (January, February, and March) to provide for adult steelhead attraction and migration. Reservoir operations on Llagas Creek may include winter base flow release management but other than flood management releases do not include specific winter pulse releases from Chesbro Reservoir. The available water is managed to provide reliability of making fall carryover storage target and the highest priority summer, then spring and winter releases to Llagas Creek.
- **Fine Sediment and Flow Attenuation.** SCVWD may, consistent with flood control needs, reduce or eliminate flood releases in order to increase the frequency of moderate floods to scour the channel, transport sediment, and reduce encroachment into the channel by riparian vegetation.
- **Carryover Volume.** SCVWD may maintain a target carryover volume in Uvas Reservoir to provide for winter and/or spring stream flows in drought years. Chesbro Reservoir may be managed to provide reliability in making the carryover storage target and the highest summer, then spring and releases to Llagas Creek.
- **Dry Years.** In dry years not all seasonal stream flow goals can be met. Operational priorities are applied to Uvas and Chesbro reservoir management when insufficient water is forecast to meet flow objectives. The Operational priorities provide an orderly trade-off of life-history support for steelhead trout based on available water and degree of risk to the population management outcomes of the operational rules applied in each system. When necessary, the step-wise trade-off will be managed in a collaborative discussion with the Wildlife Agencies.

Dam and Reservoir Maintenance

Dams and reservoirs operated by SCVWD, County Parks, and the City of San José require routine and corrective maintenance to ensure their proper inspection, functioning, and safety. SCVWD operates eight dams in the permit area, as well as Coyote Percolation pond. County Parks maintains six dams, one at Sandywool Lake and five at Grant Lake. The City of San José maintains Cherry Flat dam. Dam and reservoir maintenance activities are described below.

The Plan assumes that the entire dam face and abutments will be permanently affected (see Chapter 4 for additional detail on impacts). In addition, vegetation management may be required around the perimeter of the reservoir in areas where the water level has decreased due to annual fluctuations. Removal of debris accumulating at the dam and along the perimeter of the reservoir may also be required. Debris removal may require use of cranes and other heavy equipment operated from the dam and/or in the temporarily dry area of the reservoir that is created by fluctuating water levels.

Reservoirs may also require dredging to remove sediment in order to maintain reservoir function and capacity. This activity will take place within the reservoir basin and will utilize existing roads and disturbed areas for access and staging. Some reservoirs may have oxygenation systems installed. These systems require routine maintenance and may also require replacement.

For SCVWD, this activity does not include dewatering of the downstream channel except as related to dewatering events as described briefly below and in more detail above in Section 2.3.3 *In-Stream Capital Projects* subheading *Dewatering Even*t. For County Parks and City of San José, dewatering of reservoirs is not anticipated beyond normal use and operation of the reservoirs (e.g., typical annual fluctuations in reservoir levels) and is not required for this activity.

SCVWD Dam Maintenance Program

SCVWD's Dam Maintenance Program identifies operations and maintenance activities required to maintain the 10 dams, as well as Coyote Percolation and Rinconada percolation ponds, within SCVWD jurisdiction. Eight of these dams—Almaden, Anderson, Calero (including Calero main, auxiliary, and Fellows Dike), Chesbro, Coyote, Guadalupe, Uvas, and Vasona—and Coyote Percolation pond are located within the study area. Implementation of the Dam Maintenance Program for the eight dams located in the permit area and for Coyote Percolation pond is covered by this Plan.

SCVWD's dams and reservoirs require routine and corrective maintenance to ensure their proper inspection, functioning, and safety. Typical conditions that affect dam safety and function include:

- Normal wear of facilities caused by operational wear-and-tear, corrosion, sediment build up near the dams, scour effects, fire, wind and water erosion, seepage through the dam, wave action, and debris accumulation and other factors;
- Damage due to debris, high flows, seismic events and other factors;
- Damage due to vandalism and other human activity; and
- Damage due to burrowing animals and deep-rooted plants.

SCVWD also needs to maintain reservoir capacity and to provide native gravel for conservation measures in the channels downstream of the dams, and thus needs to establish and maintain gravel/sediment traps and access roads to these facilities in the upper ends of the reservoirs.

SCVWD conducts routine and preventative maintenance at dams and reservoirs on an on-going basis, year round. Some maintenance cannot be accomplished without dewatering the reservoir because it may be unsafe to make required major repairs using divers and repairs may require more comprehensive efforts than can be accomplished with divers, such as replacement of the inlet valves and hydraulic equipment or modification of the inlet/outlet facility itself. When dewatering is required, reservoirs may only require partial dewatering. However, this Plan assumes that all dewatering events include complete dewatering of the reservoir. Dewatering events may require up to 2.5 years.

Routine and preventative maintenance may be intensive and continuous. It is assumed that the maintenance footprint will be altered to a degree that there is no suitable habitat for any of the covered species. Over 85% of dam maintenance will permanently affect:

- The existing dam embankments, both upstream and downstream;
- Abutment areas within 100 feet of the dam face;
- Areas where there are seepage monitoring and control systems, seismic instrumentation and other monitoring equipment, valves and hydraulic lines (sometimes underwater);
- SCVWD-maintained access roads;
- The spillway area; and
- Adjacent areas within 100 feet of the spillway.

Activities may occur along roads leading to or around the dam area and in the reservoir pool area, including the delta at the upstream end of the reservoir. SCVWD may use herbicides and pesticides in accordance with BMPs described in Chapter 6, but shall be responsible for ensuring no take of covered species occurs as a result of herbicide and pesticide uses. Access roads may be paved with concrete or asphalt to manage erosion.

Although maintenance methods may vary seasonally and from facility to facility, the effects of dam and reservoir maintenance are consistent in terms of their purpose and general practices as described below.

Vegetation Removal
DSOD requires that the dam face must be clearly visible so that any erosion, seepage, slumping, drainage, or burrows can be identified and corrected. All shrubs, trees, forbs, and debris will be removed using various techniques including mechanical removal, grazing, and/or controlled burns. Grasses will be maintained at low height. To prevent deep-rooted plants and burrowing animals from compromising dam embankment integrity, trees and deep rooted shrubs will be removed.

Seepage Collection System
Seepage is water that slowly flows through a dam and to the surface usually near the downstream base. This is a common occurrence for earth fill dams, but needs accurate and regular monitoring. A change in the amount of seepage can indicate a change deep within the core of the dam, which may need to be addressed to ensure safety. A seepage collection system is installed to monitor seepage through a dam.

The seepage collection system is a component of the Dam Instrumentation Project described above under *In-Stream Capital Projects*, but it is maintained as part of the Dam Maintenance Program. The seepage collection system consists of several components at the base of a dam which collect seepage and allow accurate measurement of seepage flows through the dam. The components typically include below-grade seepage collection pipes, weirs, weir boxes, V-ditches, track racks, and an upper graded area to direct the flows to the ditches. Sedimentation occurring over time may compromise the collection function and vegetation growth may prevent visual inspection; thus access for maintenance of the seepage system must be maintained.

Seepage collection system maintenance includes cleaning debris (rocks, vegetation, weeds, etc.) from weirs, erosion repair, grading, repairing concrete, and replacing components. Repairing portions of seepage pipes would include excavation with a backhoe to inspect the pipes, removal of the old pipe, and placement of the new pipe. Grading could be required as well. Seepage control and monitoring would also include installation of new weirs.

Burrowing Rodent Control

Burrowing animals will be managed to prevent the construction of burrows. Management may involve efforts to reduce the populations of burrowing animals such as ground squirrels through use of pesticides[18], kill traps, shooting rodents with air guns, or non-lead bullets and silencers and/or excavation and re-compaction of burrows that are found on the dam face and abutments. Once initial management is conducted, SCVWD will continue to manage burrows annually. Any burrows encountered subsequent to initial management will be excavated, re-filled, and compacted expeditiously to minimize the potential of creating a population sink for covered species.

Maintenance of Access to All Facilities

Dam and reservoir access roads owned by SCVWD will be maintained including maintaining drainage under these roads. Within the maintenance footprint, road alignments may be changed and new roads constructed.

Sediment Management

It is necessary to manage sedimentation of the reservoir, both to maintain reservoir function (for example, removal of sediment blocking inlets), and to provide a source of native gravels for downstream aquatic habitat enhancement. Accordingly, there will be on-going sediment extraction, sorting, cleaning, drying, stockpiling, and hauling at the upstream end of the reservoir involving the use of heavy construction equipment.

Other Management

SCVWD may re-grade the dam embankment, repair and replace structures on and adjacent to the embankment (such as spillways, power lines, electrical facilities, repair erosion or embankment degradation, monitoring facilities, structures housing operations equipment, fencing, culverts, and other drainage facilities), and manage vegetation for fuels management and for exotic species management.

SCVWD may need to install or repair dam instrumentation other than the seepage collection system which is described above (the Dam Instrumentation Project is described above under *In-Stream Capital Projects*). This includes the repair of piezometers, inclinometers, survey monuments, real-time monitoring

[18] The use of pesticides or herbicides is not a covered activity for the USFWS permit.

systems, seepage collection systems, reservoir level gauges, and seismographs. Seismic investigations may include drilling or digging test pits or trenches. This work will be conducted concurrent with other maintenance activities described above

Major repairs to facilities may involve reservoir drawdown (dewatering) to allow access to facilities, excavation of exposed sediments, and removal of debris using a variety of heavy equipment. During such repairs, sediment may be removed from the reservoir. Based on historic frequency of major repairs, SCVWD projects that its eight reservoirs combined may require up to 18 dewatering events for 7 dams (all SCVWD reservoirs except Vasona which can be dewatered under routine operation practices) over the 50-year permit term. The 18 dewaterings are inclusive of both seismic retrofit activities and other maintenance. Dewatering events may be conducted for one hydraulic system replacement for the upstream valve for each dam (7); one seismic safety retrofit for four dams (4) (Calero, Guadalupe, Almaden, and Anderson); and one other dewatering event per dam (7).

All dewatering events would be planned in advance, require a dewatering plan as described in Chapter 6 that is approved by the Wildlife Agencies, and all releases will be consistent with **Table 2-4**.

Non-Routine Stream Maintenance

The Stream Maintenance Program permits cover “routine” maintenance, as defined by those permits. The Stream Maintenance Program permits do not cover “non-routine” activities, so these activities are covered by this Plan. Non-routine stream maintenance activities performed by SCVWD for water supply and flood protection are listed below.

- One-time extensive (approximately 50%) vegetation removal, including removal of trees larger than 6 inches in diameter, in the Lower Llagas flood control channel to restore flood protection capacity. This activity is currently outside the scope of the Stream Maintenance Program; however, once this project is conducted and overall vegetation in the channel is reduced, this reach will be maintained under the Stream Maintenance Program.
- Repairs to canals including bank stabilization, sediment removal, and vegetation management not otherwise permitted by the Stream Maintenance Program (e.g., in serpentine vegetation areas and during the wet season). Wet season work would only be required in cases where the canal filled with sediment during winter storms and delaying removal of the sediment until the summer could result in canal failure or flooding of nearby homes.

Three Creeks HCP Conservation Program Operations and Maintenance Actions

The following actions are proposed by SCVWD as part of the Three Creeks HCP and are covered activities of this Plan. SCVWD will not re-operate its facilities until it receives authorization from NMFS and CDFG. In the Three Creeks HCP study area this will be accomplished through the Three Creeks HCP. In addition to the activities described below, SCVWD will conduct general maintenance of facilities to support the Conservation Program similar to the maintenance actions described in this chapter.

Reservoir and Recharge Re-Operation

The proposed Three Creeks HCP Conservation Program addresses modifications of reservoir and groundwater recharge operations to enhance flow, temperature, and water quality conditions in the channels downstream of reservoirs to promote better fish habitat. The following activities may be implemented as part of the Conservation Program.

Summer Cold Water Releases (May 1 to October 31)

Between May 1 and October 31, SCVWD will provide steady state releases of cold water from the reservoir hypolimnion of Anderson and Guadalupe reservoirs to the creeks downstream of each dam. The average area of this activity (designated as a Cold Water Management Zone or CWMZ) for each creek extends from the reservoir release point to a defined compliance point downstream. The length of the CWMZ will vary depending on the volume of hypolimnion storage and is adjusted once a month during the implementation period.

Anderson Reservoir Releases to Coyote Creek. Prior to restoration of Coyote Creek through the Ogier Ponds (a geomorphic rehabilitation activity described above in Section 2.3.3 *In-Stream Capital Projects*), the CWMZ will extend from the base of Anderson Dam to the southernmost pond of the Ogier Ponds Complex. Following restoration of the channel at Ogier Ponds, the compliance point will be the Old Riverside Golf Course (5.5 miles downstream of Anderson Dam). Following restoration of the channel through the Coyote percolation ponds, the CWMZ will be extended by another 3 miles to a maximum length of up to 8.5 miles.

Guadalupe Reservoir releases to Guadalupe Creek. The CWMZ at Guadalupe Creek will extend from the base of Guadalupe Dam to Camden Avenue (about 4 miles).

Winter Base Flow Releases (November 1 to April 30)

Between November 1 and April 30, SCVWD will provide winter base flows adequate to maintain an 8 inches water depth over at least 25% of critical riffle area for steelhead trout in the channel reaches downstream of the following dams and on-channel structures.

- Almaden Dam, between the dam and Alamitos Diversion (steelhead)
- Anderson Dam, between the dam and Ford Road crossing (steelhead)

- Calero Main Dam, between the dam and Alamitos Diversion (steelhead)
- Camden Avenue Drop Structure on Los Gatos Creek (which is located downstream of Vasona Reservoir)
- Guadalupe Dam, between the dam and Alamitos Diversion (steelhead)

Pulse Flows (February 15 to April 30)
Upon approval from NMFS and CDFG, SCVWD will provide releases from Almaden, Anderson, Calero, and Guadalupe reservoirs to provide for two 5-day pulse flows each year when reservoir storage is available to do so. In addition, at Anderson Dam, SCVWD will provide releases up to the capacity of the outlet (approximately 550 cfs) to enhance downstream channel and floodplain habitat.

In addition, in upper Penitencia Creek, SCVWD expects to experiment with flow regimes with the intent of increasing the number of out-migrating smolts on Upper Penitencia Creek. This includes working with the City of San José to optimize operations of Cherry Flat reservoir and adjusting the recharge operation with releases from the Bob Gross Recharge ponds. SCVWD will implement a ramping schedule so that releases do not wash native fish or covered amphibians, such as foothill yellow-legged frog, egg sacs and larvae, if present, downstream.

Upper Penitencia Creek Management Program

The proposed re-operation of SCVWD facilities in Upper Penitencia Creek is intended to substantially isolate the creek from the influence of water supply operations so that these operations have minimal effect on salmonid spawning, rearing, and outmigration. Upper Penitencia Creek re-operation will enhance upstream passage for steelhead and other native aquatic species and reduce the potential for supplemental flows from the South Bay Aqueduct to affect steelhead spawning, rearing, and outmigration.

The program may include the following.

- Removal of the existing Noble Diversions within 5 years of Three Creeks HCP permit issuance.
- Relocation of the Dorel Drive streamflow gauge 200 feet downstream.
- Rededication of SCVWD's existing water right to change the beneficial use to protection of fisheries.
- Isolation of the creek from off-channel recharge operations using screens.
- Management of imported water releases to ensure flow augmentation does not result in the creation of measurable flow at Stream Gauge 87 (the existing Mabury gauge).

Supplemental Flow Program

To implement the proposed Three Creeks HCP, SCVWD may need to provide supplemental flows to the base of Anderson and Calero Main dams and bypass flows at Almaden and Guadalupe dams to ensure that the conservation strategy flow targets for summer flows can be reliably met under a variety of conditions, such as implementation of DSOD Interim Storage Restrictions, short-term equipment failures, and scheduled and unscheduled maintenance that requires reservoir dewatering.

Supplemental flows will be supplied by bypassing water around the reservoir using existing or temporary pipeline systems. If other sources of water, such as imported water or recycled water meet water quality criteria, they may also be used. Alternative water sources may be supplied through existing pipelines or through new temporary pipelines. This will require the construction of some new infrastructure to either bypass the flows from above the reservoir or to connect to alternative water supplies. Wells and pumps will be constructed in currently disturbed operational areas and pipelines will be constructed in the public rights of way. Pipelines will be constructed in and along roads, and connected to the channel at the base of the dam via existing operations roads. The footprint of these systems in natural habitats will be not more than 500 feet each. Temporary construction impacts may occur along the channel-side of the roads where the pipelines will be placed.

Temporary pipelines will be installed prior to the completion of reservoir drawdown and when supplemental flows are required. Temporary pipelines will be removed when supplemental flows are no longer needed.

Monitoring Program

SCVWD will conduct monitoring of species covered by the Three Creeks HCP. The monitoring program will include the same types of activities described below in Section 2.3.8 *Conservation Strategy Implementation*, subheading *Species Surveys, Monitoring, and Research*.

2.3.5 Rural Capital Projects

This category addresses public infrastructure projects outside the cities' planning limits of urban growth. The operation and maintenance of these projects, as well as existing facilities, are described in Section 2.3.6 *Rural Operations and Maintenance*. Activities that are stream oriented and take place mostly within stream channels, such as bridge construction, and that are implemented by the Local Partners are discussed separately in Sections 2.3.3 *In-Stream Capital Projects*, and 2.3.4, *In-Stream Operations and Maintenance.* Rural residential development projects are discussed separately in Section 2.3.7 *Rural Development*. Private rural development, including new bridges installed as part of a rural development project, are discussed in Section 2.3.7 *Rural Development*.

Rural capital projects and activities that are covered under this Plan are listed below.

- Rural transportation projects including bicycle and pedestrian improvements (see description in following section).
- Development of or upgrades to new County Parks' facilities (described below).

- Renovation, replacement, and upgrades of existing facilities.
- Closures of trails, roads, and other infrastructure (such as stock ponds) in public open space (excluding the Reserve System).
- Facility development, renovation, and expansion including offices, office drainage improvements, and visitor centers.
- Water supply projects (see description below).
- Stormwater management facilities including a detention basin proposed by Morgan Hill outside of its planning limits of urban growth.
- Capital improvement projects by County Parks and the Open Space Authority[19] (see description below).
- Kirby Canyon landfill development (see description below).
- Implementation of the South County Airport Master Plan (see description below).

Rural Transportation Projects

Transportation projects taking place outside of the planning limits of urban growth are included as covered activities in this Plan. Transportation projects within the planning limits of urban growth are considered part of urban development and are discussed in Section 2.3.2 *Urban Development*. Transportation projects inside the planning limits of urban growth and in-stream areas (i.e., bridges) are discussed in Section 2.3.3 *In-Stream Capital Projects*. Rural transportation projects provide and enhance infrastructure that supports existing development and new development planned under current general plans. Rural transportation projects and activities covered under this Plan include the following types of projects.

- County and VTA projects outside of the planning limits of urban growth and listed in **Table 2-6**. These include highway expansion, highway intersection upgrades, mass transit projects, and new road connection, extension, widening, and major realignment projects. Projects may include trails for pedestrian and bicycle use.
- County roadway safety and operational improvement projects to roads including shoulder widening and minor straightening of curves, and to intersections and driveway entrances including constructing new turning lanes, adding signals, and lengthening existing turning lanes. Projects may improve access for pedestrian and bicycle use.
- Channel modifications incidental to stream bank stabilization and road restoration.

A road realignment occurs when the position of an existing road is moved to create a more direct travel line (e.g., to eliminate a zigzag or straighten a curve).

[19] The Open Space Authority is participating in the Plan as a Participating Special Entity (see Section 8.4 *Participating Special Entities* for details).

A new connection or extension is when two different roads are connected together where a direct connection did not previously exist. New connections and extensions require up to 92 feet of road width along the length of the project and generally result in the full relocation of a section of roadway (i.e., the road is moved from one place to another). This differs from minor curve straightening conducted as part of safety/operational improvements where the roadway is slightly shifted (up to 8 feet) one way. Minor curve straightening may or may not be conducted in conjunction with shoulder widening.

Incidental take coverage will be limited to the types of projects described in the bullets above and to the specific projects described in **Table 2-6**. Projects described in **Table 2-6** include major County road projects and VTA highway and mass transit projects as described in the VTP 2035. These projects are shown in **Figure 2-7**. Transportation projects led by County Roads or by VTA occurring within the planning limits of urban growth are also shown on **Figure 2-7**, but are covered under Urban Development.

All of the VTA capital projects are proposed along existing transportation corridors and are located on the valley floor. One exception to this is that the U.S. 101 Improvement Project from Monterey Road to SR 129 includes a new extension of Santa Teresa Boulevard from Castro Valley Road to U.S. 101 (0.7 miles). This new alignment also requires a stream crossing. This project extends into San Benito County; only the portion of this project contained within the Permit Area is covered by the Plan.

County Roads has identified three new road extensions or connections in the permit area and outside of the planning limits of urban growth. These projects include:

- a connection of DeWitt Avenue to the West Edmundson Avenue / Sunnyside Avenue intersection near Morgan Hill (0.4 miles);
- a connection on Center Avenue between Omar Avenue and Buena Vista Avenue near Gilroy, requires a new stream crossing (0.2 miles); and
- a connection between Center Avenue and Hill Road across Maple Avenue immediately south of Morgan Hill (0.2 miles).

These projects will be conducted in conjunction with other road improvements. All other projects will occur along existing roads.

Two additional County road extension projects fall within or on the border of the planning limits of urban growth. These include the following projects:

- an extension of McKean Road to Almaden Expressway near the South Almaden Urban Reserve (0.2 miles) inside the planning limit of urban growth for San José; and
- an extension on Hill Road from Half Road to East Main Avenue (0.4 miles) and new connection of Peet Road to Half Road (0.2 miles) inside the planning limit of urban growth for Morgan Hill.

In addition to the projects listed in **Table 2-6**, County Roads anticipates constructing 33 miles of safety and/or operational projects that require widening of the shoulder or minor straightening of curves. These projects would require an additional 8 feet of road width over the length of the project. Up to 25 of the 33 miles may be located in the east or west hills outside of the valley floor area. County Roads also anticipates making 1.5 miles of improvements to roadway intersections and driveway entrances that include constructing new turning lanes, adding signals, and lengthening of existing turning lanes. Intersection improvements require up to 12 feet of additional road width. Up to 0.5 of the 1.5 miles may be located in the east or west hills outside of the valley floor area.

New roads constructed in association with rural development will be installed by the developer and not the County. New roads associated with rural development are described in Section 2.3.7 *Rural Development*.

South County Airport Expansion

The South County Airport is located within the unincorporated community of San Martin in Santa Clara County. The airport is bounded by U.S. 101 to the east, San Martin Avenue to the north, and Murphy Avenue to the west. A mixture of residential, commercial, and industrial uses surrounds the airport on all sides.

South County Airport is owned and operated by the County of Santa Clara. The airport encompasses 179 acres and consists of a single runway and two parallel taxiways on either side of the runway. A large building area, containing nearly all of the airport buildings, is located west of Runway 14-32.

A new Master Plan for the South County Airport was developed in 2006 (County of Santa Clara 2006c). This plan outlines the expansion and redevelopment of the airport. Actions proposed in the master plan include those listed below.

- Extending the runway.
- Realigning the runway and taxi lanes.
- Constructing a new air traffic control tower.
- Expanding the capacity for hangars, tiedowns, and fixed base operators.
- Expanding fuel storage and dispensing areas.
- Adding wash racks.
- Remodeling airport facilities and terminal buildings including parking areas and access roads.
- Expanding existing stormwater detention basins.
- Replacement of the existing septic system with a package wastewater treatment plant.
- Relocating the existing animal shelter.

- Upgrading lights and signage.

No new land will need to be purchased for the County to develop the master plan elements described above. New lands may be purchased for the purpose of protecting the safety zones around the airport, but newly purchased property would not be used for airport development (Honaker pers. comm.). Projects and activities listed above that are related to the full implementation of the South County Airport Master Plan are covered by this Plan. Environmental compliance (CEQA and NEPA) is expected to be completed in mid- to late 2010.

Kirby Canyon Landfill Development

The Kirby Canyon Landfill, operated by Waste Management of California, Inc., is located on land leased from Castle & Cook, Inc., at the southern end of Coyote Ridge near Anderson Reservoir. The need for a landfill in this area was first identified in the mid-1970s to support the urban, suburban, and rural growth of Santa Clara County. Currently, the landfill is subdivided into five fill areas and is proposed to affect 311 acres over its entire life. To date the landfill has been partially developed in Fill Area 1. Each Fill Area is composed of “cells.” Fill Areas 2 and 5 are next in the planned sequence of development following the remaining cell development in Fill Area 1. The current lease with the landowner expires in 2034.

An EIR was certified in 1983 by the City of San José for impacts on 484 acres (inclusive of a 326-acre landfill) on an 827-acre site (City of San José 1983). The landfill opened in 1986. The EIR described several sensitive biological resources at the site and required mitigation measures to mitigate the impacts to these species. Although landfill development occurs in phases incrementally over several decades, the mitigation addresses impacts on these resources that are caused by the entire landfill operation. The City of San José has issued a permit for the entire 311-acre landfill (City of San José 1984). Each of the five fill areas at the landfill is subject to subsequent City of San José Planned Development permit reissuance. These subsequent Planned Development approvals allow the City discretionary review of landfill operations, environmental conditions, and mitigation measures over the life of the landfill.

The EIR identified and addressed the following species or habitats of concern on the site: Bay checkerspot butterfly, California red-legged frog, prairie falcon, serpentine grassland plant community, and Mount Hamilton thistle. The biological conditions of approval in the City’s Planned Development permit for the landfill require a program to protect Bay checkerspot butterfly, a program to replace Mt. Hamilton thistle, and a program to preserve California red-legged frog.

In response to the EIR and the project Planned Development permit conditions, a conservation plan was developed by Waste Management in 1985, prior to the listing of Bay checkerspot butterfly, to mitigate the effects of landfill development, operations, maintenance, and closure activities associated with the property. The butterfly was not listed at the time, but it was proposed for listing.

The Federal Highways Administration obtained a conference opinion from USFWS regarding landfill impacts on Bay checkerspot butterfly because the Federal Highways Administration was preparing an environmental assessment on the construction of the Scheller Avenue interchange to serve the landfill. After Bay checkerspot butterfly was listed, the conference opinion was revised into a biological opinion in 1993.

The conservation plan for Bay checkerspot butterfly in the 1993 biological opinion specifies the provisions listed below.

- Management and monitoring of 250 acres of prime Bay checkerspot butterfly serpentine grassland habitat through a lease and control of grazing practices for 13 years[20].
- A study of revegetation methods for restoring Bay checkerspot butterfly grassland habitat to finished landfill slopes.
- Monitoring of the Bay checkerspot butterfly population.
- Study of possible relocation sites if the onsite mitigation is unsuccessful or the landfill impacts are greater than expected.

Implementation of the conservation plan is overseen by a Board of Trustees that includes a representative from the City of San José, one from Waste Management, and an independent scientist. Annual reports are provided to the Trust regarding the status of implementation of the conservation plan activities. To date, the 250-acre lease area is still managed with grazing; a revegetation plan has been prepared; the butterfly population is monitored annually; and, although offsite areas to relocate Bay checkerspot butterfly were identified, this option was found both infeasible once the butterfly was listed and unnecessary because the landfill had little effect on the stability of the butterfly population.

Subsequent to the conservation plan for Bay checkerspot butterfly, Waste Management obtained permits for filling of wetlands at the site. While Waste Management initially obtained Nationwide Permit 26 authorization for filling 3.62 acres of jurisdictional wetlands and waters of the United States associated with the entire landfill project, for business reasons the company revised its proposal and obtained a permit from the Corps (USFWS Biological Opinion 1-1-97-F-5) for filling up to 1.76 acres, including the landfill and the mitigation area. As a result of that permit process, a Mount Hamilton thistle wetland and breeding habitat for California red-legged frog were successfully established and monitored for 5 years. The California red-legged frog population at the site has been greatly increased, and annual monitoring of California red-legged frog at the site is ongoing.

Waste Management obtained additional permits from the Corps, Regional Water Quality Control Board, and CDFG to complete filling in Fill Areas 1, 2, and 5. A biological assessment was developed (Thomas Reid Associates 2003) and the

[20] Although the biological opinion required management and monitoring for 13 years, Waste Management continues to support an agreement with a rancher to control grazing levels on the 250 acres and the site is monitored annually for the Kirby Canyon Landfill Conservation Trust (Waste Management 2008).

subsequent biological opinion issued for the Corps permit (1-1-03-F-0213; July 2003) addresses California red-legged frog, Santa Clara Valley dudleya, and Bay checkerspot butterfly critical habitat for the entire 827-acre project site. The 2003 biological opinion requires that, upon closure of the landfill, a permanent conservation easement be placed on 300–350 acres of restored landfill for the protection of California red-legged frog. An endowment will be established to provide adequate financing for the perpetual management and maintenance of the conservation easement. Other mitigation includes creating an additional wetland and offsite habitat restoration.

Permits and mitigation for wetland impacts in Fill Areas 3 and 4 of the planned 311-acre landfill have not been authorized.

In summary, USFWS has issued biological opinions providing take authorization for the entire approved landfill footprint for California red-legged frog, Bay checkerspot butterfly and its critical habitat, and Santa Clara Valley dudleya. Mitigation already in place for the entire envisioned and approved landfill footprint includes establishment of new breeding habitat for California red-legged frog, restored upland habitat for the frog, restored serpentine habitat for Bay checkerspot butterfly and rare plants, and funding to provide long-term monitoring and adaptive management of permanent habitat easements (U.S. Fish and Wildlife Service 2003).

USFWS found that the entire landfill development is not likely to jeopardize the continued existence of the listed species or to adversely modify or destroy Bay checkerspot butterfly critical habitat in Unit 8. While the entire landfill project has USFWS authorizations for the species listed above, and local zoning and use permits, future authorization for currently undisturbed portions of Fill Areas 3 and 4 will be required from the Corps and state agencies.

Future development of Fill Areas 3 and 4 at Kirby Landfill are covered activities in this Plan for the covered species not already addressed in the existing biological opinions for the site (i.e., all species covered by this Plan except Bay checkerspot butterfly, California red-legged frog, and Santa Clara Valley dudleya).

SCVWD Off-Channel Groundwater Recharge Ponds

To enhance its water supply infrastructure and to meet future anticipated demand, SCVWD may construct additional groundwater recharge ponds (also called percolation ponds). SCVWD anticipates that up to four new, off-stream groundwater recharge ponds and associated conduits will be installed within the permit area over the course of the permit term. Three of these sites will be located along the valley floor within Morgan Hill and to the south in San Martin. While these sites are in close proximity to Llagas Creek, the ponds will be constructed off-channel. The fourth site will be located near the Cross-Valley Pipeline in the southern portion of the Coyote Greenbelt and will also be off-channel. The three sites in Morgan Hill and San Martin will each be approximately 10 acres in size. The site in the Coyote Greenbelt will be approximately 15 acres in size. The exact location of the ponds will be identified through future siting studies. However, the approximate locations are shown on **Figure 2-6**. These new off-channel recharge ponds are separate from the reoperation of the Ford Road and Church Avenue recharge ponds described above in Sections 2.3.3 *In-Stream Capital Projects* and 2.3.4 *In-Stream Operations and Maintenance*.

These projects may require installation of piping or a conduit to transport local and imported water to the sites, but will not require any additional in-channel diversions. Sites in Morgan Hill are generally supplied, by pipeline, with Central Valley Project water from San Luis Reservoir. If the Santa Clara Conduit is shut down due to maintenance or inspections, water may be provided by Anderson and or Coyote Reservoirs. The site in San Martin will likely receive water from Chesbro and Uvas Reservoirs via the Uvas/Llagas Transfer Pipeline. The site in the Coyote Greenbelt will likely receive water via the Cross-Valley Pipeline. These projects may also require up to 1.5 miles of new access roads; however, existing access roads will be utilized whenever possible. Construction of these ponds is a covered activity under this Plan.

County Parks Projects

As guided by the *Santa Clara County Parks and Recreation System: Strategic Plan* (County of Santa Clara, Parks and Recreation Department, August 2003), County Parks continues to develop integrated master plans and natural resources management plans that incorporate recreation, resource planning, historic planning, interpretive planning, operations and maintenance impacts and environmental documentation. To date, County Parks has developed several park and trail master plans and natural resource management plans that it currently implements and will continue to implement throughout the permit term. All of these plans will be updated during the permit term of this Plan to address the on-going and changing operational needs of its parks. In addition, County Parks is developing or plans to develop master plans and natural resource management plans for several additional parks.

To develop the following list of projects and activities, County Parks evaluated past, present, and anticipated activities and projects for which it will require coverage during the permit term. The projects and activities covered by this Plan include the following.

- Trail and fire road development, and installation of related infrastructure such as bridges, staging areas, restrooms, parking lots, and signage.
- Development of borrow sites for materials used for trail structures (e.g., rock) or restoration projects (e.g., clay for wetland substrate). Whenever possible, borrow sites will be used to create habitat for covered species (e.g., a pond for California tiger salamander). Location of borrow sites will be within County parks, but exact locations are unknown at this time. County Parks will avoid sensitive land cover types. Over the permit term, County Parks estimates that borrow sites will require up to 3 acres. Borrow sites will be primarily sited in grassland areas that support conversion to wetland or

pond habitat once borrow materials are excavated. If County Parks creates ponds for the improvement of covered species, soil removed may be stockpiled and stored for future use to reduce the need for additional borrow pits at future times.

- Development of regional recreation opportunities and supporting infrastructure including group and family picnic areas, drive-in campgrounds, back-country camp areas, a regional swimming facility, nature/education centers, historic and cultural resources, disc golf courses, an 18-hole golf course and club house, sport fields, off-leash dog parks, dog runs, road and mountain bicycle park, fishing ponds, events pavilions, shade structures, hang gliding/paragliding landing sites, urban edge farming, historic agricultural park, agricultural marketing area (i.e., expanded produce stand, farmers market area, retail café, and parking), community gardens, research and demonstration gardens, youth agricultural areas, staging areas including restrooms, equestrian staging areas including water troughs, parking, operations and maintenance facilities and buildings, park ranger facilities, multiple use areas, public art installations, gateway sites (e.g., trailheads, park entrances, kiosks), paved and dirt roads, seating (e.g., benches), landscaping, fencing, irrigation, water tanks, interpretive signage, sewer, water, and other utilities.
- Capital improvements to existing trail systems including reconstruction, realignment and, in areas where the use is compatible, the addition of separate single-use trails (e.g., equestrian trails). These improvements also include trail restoration in areas where abandoned trails are no longer in use.
- Capital improvement expansion or rehabilitation of existing facilities including campgrounds, equestrian camping sites, day-use picnic sites, staging areas, parking, restrooms, entry and gateway sites (e.g., trailheads, park entrances, kiosks), buildings, landscaping, irrigation, fencing, interpretive signage, sewer, water, and other utilities.
- Restoration, creation, enhancement, and/or rehabilitation of habitat including riparian, wetlands, ponds, grassland, and oak woodland natural communities outside of the Reserve System (restoration and enhancement within the Reserve System on County Park lands is described in Section 2.3.8 *Conservation Strategy Implementation* below).
- Installation of fish screens at Parkway Lakes, Cottonwood Lake, and Spring Valley to prevent movement of fish in and out of these lakes and to support recreational fishing opportunities.
- Construction of stock ponds or spring boxes[21] for cattle management and installation of wells to supply stock ponds outside of the Reserve System (restoration and enhancement within the Reserve System on County Park lands is described in Section 2.3.8 *Conservation Strategy Implementation* below). Spring boxes will be preferred over wells. Up to 40 wells or spring boxes may be constructed for use in County parks. Wells and spring boxes will be sited so that they do not degrade surrounding habitat.

[21] Spring boxes are boxes or culverts installed into the ground to provide water through a series of pipes to a tank or directly to a trough for recreation or cattle management.

- Reconstruction of pond dams or spring boxes to maintain water levels and facility functioning.
- Replacement of the water delivery system at Jackson Ranch. This includes excavation and replacement of the existing system.

Intensive recreational uses or facilities (e.g., golf courses, regional sports complexes, sports fields, pavilions, nature centers, off-leash dog parks) generally are planned to occur in the valley floor area closer to urban and rural centers. Facilities planned in the near and far hills will focus on less intensive recreational uses such as trails and back-country camping sites.

County Parks estimates it will construct outside of the planning limits of urban growth no more than 20 miles of fire road; 25 miles of unpaved, single-track trail; 3 miles of paved service roads; 7 miles of paved multi-use trail; and 10 miles of paved roads. This does not include roads and trails that are part of a larger site development (e.g., nature center, large picnic areas, pavilions, golf course, etc.). County Parks estimates it will construct outside of the planning limits of urban growth up to 300 non-bridge water crossings (e.g., single-track trail crossings), 20 large bridges (i.e., one-or two-way automotive use), and 30 small bridges and puncheons (i.e., footbridges). County Parks estimates it will conduct larger-scale site development projects (e.g., nature center, large picnic areas, pavilions, golf course, etc.) outside of the planning limits of urban growth requiring approximately 1,700 acres.

City of San José Projects

Alum Rock Park Riparian Management Plan provides a management strategy to protect and restore the riparian and aquatic resources along Upper Penitencia Creek within this 740-acre Park (Biotic Resources Group 2001). The Riparian Management Plan provides a comprehensive set of goals, policies, and management actions that integrate watershed resources and reflect the unique quality of the park’s riparian and aquatic resources. This management document is focused on enhancing and restoring Upper Penitencia Creek with Alum Rock Park.

Activities that will be conducted under this plan include the following.

- **Hillside instability and landslide prevention.** Measures to reduce the potential for mass wasting this include the repair of eroded area and revegetation of exposed areas. Activities may also include improvements to hillside drainage by installing additional culverts along localized roads and trails.
- **Streambank erosion.** Consider setting back the existing bank and recontouring the slope to reduce existing erosion issues. Projects may include enhancing the channel bed to provide pooling areas and vegetative cover along the channel.

- **Riparian and aquatic habitat restoration and enhancement.** Revegetate the sediment bar and other degraded areas adjacent to the stream channel to restore a riparian corridor. Create new and expand the existing floodplain and side channel habitat.
- **Facility upgrades.** Relocate existing picnic area approximately 20 feet outside of the riparian corridor.

Open Space Authority Projects

As described above, the Open Space Authority owns and manages several properties in the study area. Although not a Permittee, the Open Space Authority has requested that their activities within the permit area be covered by the Plan if they choose to seek this coverage as a Participating Special Entity (see Chapter 8, Section 8.4 *Participating Special Entities* for this method of coverage).

The Open Space Authority will be developing use and management plans for each property to address protection of natural and cultural resources; opportunities for appropriate visitor access and passive recreation; environmental education and outreach; site safety; and maintenance and operations. These plans will be updated over the course of the permit term, and new use and management plans will be prepared for additional properties that are protected by the Open Space Authority.

Open Space Authority staff evaluated typical open space preserve management projects and activities that occur on existing land holdings, as well as those that are anticipated to occur on future land holdings, in order to identify projects and activities that will require coverage by this Plan. These include:

- Construction and maintenance of visitor amenities including parking areas, roadside pullouts, trailheads, and associated restrooms, picnic areas, shade structures, interpretive facilities, signage, landscaping, and utilities. Construction or repair of existing structures for use as nature centers, hostels, education facilities, or staff support facilities.
- Construction and maintenance of new multiple-use trails with associated bridges, culverts, fords, or other water crossings, and armored surfacing where necessary to accommodate those with disabilities. Installation of signage, benches, and facilities such as back-country campsites and interpretive displays.
- Construction and maintenance of necessary agricultural infrastructure including farm stands, community gardens, research and demonstration gardens, fencing, gates, stock ponds, developed springs, water tanks, and irrigation and drainage infrastructure.
- Maintenance of existing roads including repair, replacement, and installation of bridges, culverts, and other road drainage structures. Decommissioning and restoration of former logging or ranch roads that are no longer necessary for safety patrol, fuels management, or recreational purposes. Realignment

or construction of new roads when necessary to replace poorly located roads that are impacting the environment.

- Development of facilities for management and administration of open space resources including field offices, corporation yards, on-site employee housing, and storage facilities.
- Implementation of resource management and monitoring programs such as restoration, creation, and/or enhancement of habitat including riparian, wetlands, ponds, grassland, mixed evergreen, and oak woodland natural communities. Typical resource management programs include grassland management utilizing cattle grazing and prescribed fires; eradication of invasive plant and animal species, herbicide use, and integrated pest management projects; wildland and urban-interface fuels management including prescribed fires, grazing, and shaded fuel breaks; in-stream and riparian habitat restoration; signage and fencing to protect and/or interpret cultural sites; and implementation of road and trail best management practices to reduce erosion and sediment delivery to watercourses.

2.3.6 Rural Operations and Maintenance

This category addresses the rural operations and maintenance activities to be covered under this Plan. Operations and maintenance activities within streams are described separately in Section 2.3.4 *In-Stream Operations and Maintenance*. Rural operations and maintenance activities outside of streams that may receive coverage under this Plan include the following.

- Utility line or facility operations and maintenance as described below.
- Facility maintenance including vegetation and infrastructure management.
- Pond maintenance outside the Reserve System.

Utility Maintenance

Public and private utility infrastructure such as electric transmission lines, gas pipelines, petroleum pipelines, telecommunications lines, and cellular telephone stations cross the study area. Public and private utilities that are Participating Special Entities (see Section 8.4 *Participating Species Entities*) may request coverage under the Plan for routine maintenance and repair of existing utilities within the permit area. Maintenance activities will generally require trenching around existing pipelines and conducting repairs or replacing segments of pipeline. Coverage for these projects will be decided on a case-by-case basis by the Implementing Entity and Wildlife Agencies. This will allow alternative maintenance approaches, if possible, to avoid or minimize impacts on covered species and natural communities.

Facility Maintenance

Facility maintenance refers to maintenance of existing facilities such as buildings, roads, trails, parking lots, and airport property. A large component of this maintenance is vegetation management. Vegetation management includes fuel reduction using prescribed burns, grazing activities, exotic vegetation control/removal, hazardous tree work, abatement of hazardous vegetation, and algae control in ponds. Vegetation management also includes turf management, paving, and landscaping around infrastructure and facilities.

Facility maintenance also includes the maintenance of infrastructure such as buildings, roads, utilities (septic, water, power systems), and stormwater treatment. Rodent, pest, and invasive plant species abatement activities may also be conducted for facilities maintenance.

Pond Maintenance

Pond maintenance on private lands outside the Reserve System is a covered activity if the project proponent receives a ministerial or discretionary permit for this activity from the County or one of the participating cities and complies with the management actions below in addition to the conditions and application processes described in this Plan (see Chapter 6). This covered activity is designed to provide an alternative permitting mechanism for maintenance of stock ponds, but it may support other pond maintenance needs as well. Removal of existing stock ponds is not covered under pond maintenance.

The following management actions are consistent with the conservation strategy management actions for ponds described in Section 5.3.7 *Wetland and Pond Conservation and Management*.

Required Management Actions

- All vegetation removal will occur after the breeding season for pond-dependent wildlife, including nesting migratory birds.
- If vegetation targeted for removal includes nonnative vegetation on which covered species rely for habitat (e.g., tricolored blackbirds nesting in Himalayan blackberry), the removal will be undertaken in phases over a 3- to 4-year period and replaced with similar, native vegetation suitable to the site.
- If the pond is located in modeled California red-legged frog habitat, vegetation management activities may only occur between August 30th and October 15th.
- If the pond is leaking, repairs will be made to improve water retention and duration.
- All invasive or predatory non-native species (e.g., bullfrogs, mosqitofish, and nonnative predatory fish) will be removed and disposed of by a qualified

biologist. Management techniques described in **Appendix K** *California Tiger Salamander Hybridization*, will be implemented, as deemed appropriate by the project proponent in coordination with the Implementing Entity.

- If the pond is creating or contributing to local erosion, fixes will be made to eliminate the ponds contribution to such issues.
- If needed, dredging will be conducted during the non-breeding periods of covered and other native species (e.g., tricolored blackbird, California tiger salamander, California red-legged frog, or western pond turtle).
- Any disturbed areas will be re-seeded with native vegetation appropriate for the surrounding natural communities for replacement of lost ecological services and function.
- Any herbicide application conducted in ponds or wetlands must use products that have been approved for aquatic communities.
- Grazing rotation and targeted fencing will be used to maintain appropriate vegetation in and around the pond and to reduce existing or potential erosion issues.

Recommended Management Actions

- If a pond dam requires reconstruction, consider increasing the spillway elevation to increase pond capacity and improve water duration if appropriate[22].
- If the pond lacks vegetation, consider native plantings where appropriate, after consultation with the Implementing Entity.
- Coarse woody debris or anchored basking platforms may be installed in ponds to improve habitat for western pond turtles (Hays et al. 1999).

Activities conducted by individual Local Partners are identified below.

Santa Clara Valley Water District

SCVWD operations and maintenance activities outside of streams (i.e., in upland areas) that will receive coverage under this Plan include the following.

- Operations and maintenance of pump stations, operations yards, utility yards, and corporation yards including storing sediment, and truck access.
- Off-stream groundwater recharge sites and associated facilities. Activities may include removal of sediment and vegetation and maintenance of associated roads, diversion structures, and catwalks. See Section 2.3.4 *In-*

[22] In some cases, increasing the spillway elevation may not be appropriate because increasing the inundation period may facilitate the persistence or introduction of non-native species that have detrimental effects on covered species.

Stream Operations and Maintenance subheading *Recharge Operations and Maintenance* for additional detail.

- Maintenance of water supply facilities including buildings, rain gauges, pipelines, and turnouts (Pipeline Maintenance Program is described below).

Rain Gauge Maintenance

SCVWD maintains 39 rain gauges throughout the County. These gauges have a footprint of 9 inches in diameter and are generally located in the upper watershed. Maintenance includes spraying herbicide around the base of the gauge, trimming and/or removal of small to large trees affecting the “catch” of rainfall (i.e., the ability to capture rainfall unobstructed), and trimming of vegetation along access roads to reduce fire hazards. Maintenance may also include modification and/or reconstruction of existing rain gauges. During maintenance a radius of approximately 3 feet is cleared all around the gauge. Rain gauges are accessed from the nearest road. Maintenance of rain gauges is a covered activity under this Plan.

Pipeline Maintenance Program

SCVWD developed the Pipeline Maintenance Program document (Santa Clara Valley Water District 2007a) and issued the Pipeline Maintenance Program Final EIR (Santa Clara Valley Water District 2007b) in September 2007. SCVWD owns and/or maintains several pipelines and pipeline facilities throughout the study area. These pipelines are located in both unincorporated and incorporated areas of the permit area. However, because the majority of impacts associated with implementation of the Pipeline Maintenance Program will occur in rural areas, the program is discussed in this section.

To address maintenance for these pipelines, SCVWD developed the Pipeline Maintenance Program to establish a process for conducting routine water-conveyance-system maintenance activities within its jurisdiction. The work area subject to the Pipeline Maintenance Program includes the areas around water conveyance systems facilities, including pipelines, pump stations, blow-offs, turnouts, and vaults. The project area also includes the streams, fields, storm drains, and channels where discharge of water during pipeline draining can occur. Pipeline maintenance activities also occur off-stream within urban areas, however, those activities are expected to have much less impact on covered species within urban settings. Additionally, all types of urban operations and maintenance programs are addressed in the urban development category.

Facilities owned and/or operated include the following pipelines and components.

- Almaden Valley Pipeline.
- Anderson Force Main.

- Calero Pipeline.
- Campbell Distributary.
- Central Pipeline.
- Coyote Pumping Plant.
- Coyote-Madrone Pipeline.
- Cross Valley Pipeline.
- East Pipeline.
- Main Avenue Pipeline.
- Milpitas Pipeline.
- Mountain View Distributary.
- Pacheco Conduit and Pacheco Tunnel.
- Pacheco Pumping Plant.
- Parallel East Pipeline.
- Penitencia Force Main.
- Rinconada Force Main.
- Santa Clara Conduit and Tunnel.
- Santa Clara Distributary.
- Santa Teresa Force Main.
- Snell Pipeline.
- Stevens Creek Pipeline.
- Sunnyvale Distributary.
- West Pipeline.
- Uvas-Llagas Transfer Pipeline.

The Pipeline Maintenance Program defines a comprehensive approach to managing the environmental impact of maintenance. The Pipeline Maintenance Program specifies protocols for management and maintenance crews from different divisions working on the same activity to conduct the operations, including the environmental commitments, associated with that work.

In developing the Pipeline Maintenance Program, it was SCVWD's intent that the program and mitigation defined in the Pipeline Maintenance Program serve as the basis for state and federal permits and permit conditions; therefore, regulatory agencies were consulted early in the Pipeline Maintenance Program definition process.

The routine maintenance activities described in the Pipeline Maintenance Program address both raw and treated water pipelines. Over 125 miles of pipeline support delivery of local and imported water in the County. Activities covered by this Plan include the following. If excavation is required for the activity, it is noted below.

- Cathodic protection and monitoring. Cathodic protection is typically applied to a pipeline by applying small electric current that overdrives or redirects the natural corrosion process, controlling the natural decomposition process of steel to iron-ore. This is accomplished through the use of inexpensive sacrificial metals such as magnesium or zinc electrically attached to a pipeline or by forcing an electric current with an external power supply. Cathodic protection systems are monitored frequently to adjust them to varying soil environments, water tank levels, coating deterioration, and external construction. Where sacrificial metals are employed, routine monitoring is necessary to determine the sacrificial metal’s condition and future replacement.
- Leak repair. May require blow-off—dewatering of pipes that typically includes a point sources of high velocity flow—to local uplands or streams and/or excavation to access pipelines. The schedule for leak repairs is variable, guided by the results of monthly visual inspections made by helicopter. The Pipeline Maintenance Program requires a *Water Discharge Definition Plan* for this activity. A *Water Discharge Definition Plan* would describe the total volume discharge water and flow rate, nozzles, vaults, blowoffs, and dissipaters to be utilized.
- Internal inspection. May require blow-off to local uplands or streams. Internal inspections are planned at 5–10 year intervals for each pipeline. Certain facilities (Santa Clara Tunnel, Pacheco Tunnel, and Calaveras fault crossings) once every 5 years. This activity requires a *Water Discharge Definition Plan* (see above bullet for description).
- Unscheduled releases of water due to a pressure surge in a pipeline that could damage pipeline. Under such conditions, an automatic turnout valve will open and release the water to prevent the pipe from bursting. Flows from the pipeline may be reduced following such an event. This type of event is only expected to occur at two facilities located along Los Gatos Creek, the receiving body for these releases. This would occur infrequently, but there is no data system associated with these valves, thus SCVWD does not know exactly how often this occurs. The valves would open for less than one minute and would shut as soon as system pressure dropped.
- Rehabilitation and/or replacement of pipeline components including but not limited to air release valves, piping sections or connections, joints, and appurtenances. Activities may include excavation to access pipelines.
- Bank stabilization and erosion control within creek related to pipeline maintenance. Discharges either come out of pipes within a stream bank and flow down the bank into the channel, or are pumped down or across a stream bank. Bank protection work would occur prior to a planned discharge in areas where banks within 50 feet of the discharge point show signs of erosion or instability. May require excavation.

- Replacement/repair of buried service valves (including valves within creek embankments that may require excavation and minor bank stabilization activities).
- Maintenance of pipeline turnouts, including access to pipelines.
- Replacement/repair of appurtenances, fittings, manholes, and meters.
- Vault maintenance. Vaults occur along segments of pipeline. Pipeline components are located within vaults. There are different types of vaults and all are considered confined spaces. Structures other than the pipeline contained within vaults include valves, electrical stations, turnout piping, etc. Telemetry pull boxes, corrosion monitoring stations, and some air release valves are not located within vaults. Vaults are typically made of concrete and may be located immediately below grade (below ground level) or partially or fully above grade.
- Telemetry cable/system inspections and repairs. Telemetry systems allow communication of data from the pipeline to SCVWD so that they can track the operations of the pipeline. Telemetry cables are generally sited in the center of roads. May require excavation to access system components.
- Meter Inspections and repairs. Flow meters measure the rate of flow through a pipeline. Some meters are located in vaults while others are not.
- Maintenance of pump stations, operation yards, utility yards, and corporation yards.
- Maintenance of pump stations, operation yards, utility yards, corporation yards, vaults and turnouts includes vegetation management. This task may be accomplished through chemical and/or mechanical means depending on the sensitivity of the regional habitat.
- Access road repairs. Excavations of various sizes are often needed to maintain the access roads. Excavation may be required to fill pot holes, conduct drainage and erosion control, conduct shoulder and slope repair, or regravel existing access roads. Access road excavations could be very small (e.g., to repair a pot hole or shoulder slump), or involve larger, linear excavations (e.g., to install or replace culverts or drainage ditches, repair slope failures for elevated access road fills).

This is the general list of activities that are necessary to maintain proper function of all pipelines within SCVWD system. Each of these activities includes additional subtasks, which are the individual steps involved in completing the overall activity.

As noted above, blow-offs are sometimes required to repair or inspect a pipeline. If available, SCVWD directs released water into available turnouts such as off-channel recharge ponds. If not available, water may also be directed to local waterways, storm drains, other urban drainage channels, open fields, or wetlands. Discharge into waterways is accomplished first by gravity flow and then by pumping out residual water. Flow rates can be controlled manually to be between 0–20 cfs for gravity flow blow-offs by manipulating valves. Maximum pump capacities range from 3.3 to 11 cfs. The discharge rate is ramped up slowly such that the buildup of water in any streams, rivers, or canals is gradual and scouring of the channel bed and ground surfaces does not occur. Discharge to wetlands is generally avoided (it may require additional regulatory permits), although it is sometimes necessary. Discharge to dry soil is also avoided and is not common for large volumes of water (see Chapter 6, Condition 5 for additional stream avoidance measures for pipeline maintenance activities).

The Pipeline Maintenance Program Final EIR identifies direct permanent and temporary impacts from activities grouped into the categories of staging, off-road access, pipeline drainage, excavation, and repair. Impacts are assessed based on assumed for annual maintenance activities. Consistent with two key assumptions of the EIR, this Plan would cover the effects associated with the maintenance of up to 5 pipelines each year. It would also cover up to a total of 10 blow-offs (scheduled and unscheduled) each year. See Chapter 4 for additional detail related to the impacts of this activity. Pipeline Maintenance Program activities outlined above that fall within the permit area may receive coverage under this Plan.

County of Santa Clara

Rural operations and maintenance activities conducted by the County of Santa Clara outside streams that may receive coverage under this Plan are listed below.

- Maintenance, repair, and rehabilitation of County roads and road shoulders, including pothole repairs, overlays, resurfacing of existing paved areas, construction of retaining walls to stabilize adjacent embankments, vegetation removal (e.g., overhanging bushes, trees), and re-grading to maintain a functional shoulder.
- Maintenance of infrastructure associated with roads including drainage ditches, culverts, and retaining walls.
- Operations, maintenance, and fire protection of rural juvenile detention facilities (e.g., James Ranch and Muriel Wright Center), medical treatment facilities (e.g., Mariposa Lodge), the Santa Clara County Justice Training Center (also known as Holden Ranch), and the Santa Clara County Weapons Training Center (also known as the Sheriff's Firing Range).
- Operation, maintenance, and management of County parks including trail and road maintenance, facility maintenance, vegetation management around structures.
- County Parks management of natural resources including grassland, oak woodland, and riparian natural communities; protection and enhancement of freshwater resources; erosion control; sensitive species management and monitoring outside of the Reserve System (restoration and enhancement within the Reserve System is described in Section 2.3.8 *Conservation Strategy Implementation* below). Management may include prescribed burns, mechanical fuel removal, invasive vegetation management, manual labor, herbicide use, bullfrog management, feral pig removal, management of other exotic nuisance species, and managed grazing.

- County Parks management and maintenance of ponds and spring boxes including temporary draining for amphibian management, dredging or clearing of debris and sediment for water management for cattle, and rehabilitation due to erosion and/or pond or box failure. This does not include pond removal.
- County Parks dam maintenance including burrow management, vegetation removal, dam repairs, and dam facility repairs (short of dam reconstruction which is described above in Section 2.3.3 *In-Stream Capital Projects*).
- Removal of infrastructure (e.g., building structures, roads, trails, stock ponds) for public safety, resource protection, and park management. County Parks may remove up to four stock ponds that do not provide habitat for covered species. Ponds that do provide habitat for covered species may be considered on a case by case basis by CDFG and USFWS.
- Use of County parks consistent with park management plans. Uses vary by park but may include walking, hiking, horseback riding, biking (road and mountain), fishing, swimming in designated swim facilities, recreational sports, nature watching, horse-drawn carts, drive-in camping, equestrian camping, back-country camping, on- and off-leash dog areas. Coverage is only provided to County Parks for the indirect effects of allowable recreational uses.
- Vegetation management for exotic species removal and native vegetation plantings including the use of livestock grazing and prescribed burns.
- Trail maintenance including grading, clearing, brushing, erosion control, paving, re-paving, abandonment, and restoration.
- Pest abatement to manage rodents, insects, and disease, and weed abatement to manage fire hazards outside the Reserve System including removal of dead and dying wood, trees, and vegetation in agricultural areas. May include mowing or disking for weed abatement and spraying for insect and disease management. Use of rodenticide is not covered by this Plan for the USFWS permit.
- Surveys and monitoring to support management decisions outside of the Reserve System (monitoring within the Reserve System is described in Section 2.3.8 *Conservation Strategy Implementation* below).
- Enhancement and restoration projects outside of the Reserve System.
- Removal of fish barriers (such as low flow crossings) and installation of fish screens.
- Maintenance of water delivery systems (e.g., at Jackson Ranch). This includes maintenance of in-stream structures that have a screened pipe that pulls water from a local stream into the property.
- Activities associated with the maintenance of large facilities including golf courses, large event facilities, and sports complexes.
- Equestrian facilities and uses including equestrian stables, equestrian centers, trails, manure management, equestrian group camping and horse grazing activities.

- Minor remediation projects (less than 1.0 acre) for spills, illegal dumping, fuel/chemical storage, and firing ranges.

Open Space Authority

Operations and maintenance activities conducted by the Open Space Authority in all of their preserves (both existing preserves and preserves acquired during the permit term that are located within the permit area) are covered by this Plan if they choose to seek this coverage as a Participating Special Entity (see Chapter 8, Section 8.4 *Participating Special Entities* for this method of coverage). Maintenance activities may include the following.

- Vegetation management, including fuel reduction using prescribed burns, grazing activities, exotic vegetation control/removal, hazardous tree work, abatement of hazardous vegetation, and algae control in ponds.
- Invasive wildlife species management, including feral pig and bullfrog management.
- Restoration, rehabilitation, and enhancement, not including removal, of existing stock ponds that have degraded due to severe erosion or dam failure.
- Creation of new ponds to support livestock grazing or wildlife.
- Spring development, including installation of a spring box, and repair of existing spring boxes.
- Road and/or trail closure or realignment due to erosion problems or close proximity to sensitive land cover types.
- Use of Open Space Authority lands outside of the Reserve System consistent with their management plans (activities within the Reserve System are described below). Uses vary by park but may include walking, hiking, biking (road and mountain), horseback riding, and nature watching. Coverage is only provided to the Open Space Authority for the indirect effects of allowable recreational uses.
- Activities associated with the maintenance of facilities including small structures, paving, and landscaping.
- Maintenance of infrastructure facilities including buildings; roads (paved and unpaved); and utilities (septic, water, power systems).

2.3.7 Rural Development

Rural development includes private development that will occur in accordance with existing general plans at the time of permit issuance. This includes activities that are subject to a ministerial or discretionary approval by the County or cities. Most of this type of development is expected to be residential development in areas outside the planning limits of urban growth. This generally occurs in the unincorporated county, but some development may occur within city limits. For the three cities, San José has the most potential for this type of development in its hillside-designated areas that lie outside of the planning limit of urban growth but within the city limits. Gilroy and Morgan Hill may have some of this type of development as well. Rural development may occur in areas designated in **Figure 2-2** as rural residential or ranchland/woodland land use categories. Rural development is also anticipated in agriculture land use areas as is currently allowed and identified in local general plans.

Rural development activities covered by the Plan are listed below.

- Commercial, industrial, institutional, and recreational development in unincorporated areas of the county, including San Martin, consistent with the County General Plan (County of Santa Clara 1994). This includes County projects at the Mariposa Lodge, James and Holden Ranches, and Muriel Wright Center.
- New intensive agriculture and related activities that require discretionary approval consistent with local general plans, such as mushroom farms, commercial stables, equestrian event facilities, and wineries.
- Rural residential development (e.g., single family homes, subdivisions) consistent with the County General Plan (County of Santa Clara 1994). This may include privately owned bridges, driveways, access roads, vineyards or orchards, and other features commonly associated with rural dwelling units.
- Rural residential development on the non-urban hillsides of eastern San José (outside the planning limit of urban growth) and in the Coyote Valley Urban Reserve and South Almaden Valley Urban Reserve consistent with the San José General Plan.
- Rural residential development in the Morgan Hill Southeast Quadrant consistent with the Morgan Hill General Plan.
- Rural residential development in the Hecker Pass Specific Plan area consistent with the Gilroy General Plan.
- Non-residential development in rural areas that requires approval from the County or cities, such as telecom facilities and small utility outposts. Solar energy projects in rural areas are covered by the Plan as long as their impacts to covered species and natural communities are consistent with the effects evaluation in Chapter 4.

Three projects covered under this Plan in accordance with the first item above are described below.

Expansion of the Z Best Composting site located at 980 SR 25 south of Gilroy. The owner, Zanker Road Resource Management, is proposing to expand the composting facility. Preliminary site plans show an expansion of approximately 63.4 acres at full buildout. The expansion plan is divided into four phases.

- Phase 1 expansion of 26.1 acres.
- Phase 2 expansion of 14.0 acres.

- Phase 3 expansion of 11.4 acres.
- Phase 4 expansion of 6 acres.

This project will also include construction of a sedimentation basin of 5.9 acres. The project area is surrounded by agricultural land uses.

Expansion of the existing Pacheco Pass Landfill located at 3675 Pacheco Pass Highway east of Gilroy. The landfill is operated by Norcal Waste Systems; the existing use is a composting facility and landfill. This project is currently undergoing CEQA review with the County. The project proposes to expand the facility to construct a 48,160square-foot (<1-acre) transfer station to house local solid waste and recycling. The transfer station will utilize about 5.25 acres of the approximately 60-acre existing site, excluding use of an access road currently used for the composting and landfill operations on site.

Expansion of the Freeman Quarry. The existing Freeman Quarry has been proposed to be expanded. The quarry is located at 3201 Monterey Road on Castro Valley Ranch. The quarry is operated by Granite Construction Company on lands owned by Castro Valley Properties, Inc., and is located approximately 5 miles south of Gilroy. The project is proposed as a 90-acre expansion of the existing 61-acre quarry (final size = 151 acres). The expansion area is proposed to include 56 acres for mining or ancillary uses and 34 acres for overburden placement. The quarry would expand to the north and west of the existing quarry. Overburden would be placed at the far northern end of the expansion area.

Implementation of this project includes the following operational requirements.

- During the rainy season (October 15 through March 31) night hauling activities will not occur between 1 hour before sunset and 1 hour after sunrise if rain is falling. “Rainfall” shall be defined as a measurable amount (0.01 inch or more) of liquid precipitation as measured at the NOAA gauge located in Gilroy, California. If a ”chance” of rain, defined by NOAA as >50% probability, is forecasted within 24 hours of scheduled night hauling operations (sunset to sunrise), then all night hauling operations shall be canceled and shall not be recommenced or rescheduled until after sunrise. It is assumed that if rain falls at some time during a calendar day during the rainy season, then the chance of rain is over 50% and night hauling operations will not occur.
- Nighttime lighting during the rainy season will be directed away from habitat for covered amphibians.
- Continue to maintain existing ponds on the project site. Maintenance may include periodic draining of ponds to manage exotic species.

Private Development Subject to the Plan

All private development activities, including rural development, will be subject to all applicable Plan conditions and fees if they meet the criteria described above in Section 2.3.2 *Urban Development* subheading *Private Development Subject to the Plan*.

2.3.8 Conservation Strategy Implementation

In addition to the projects described above, the Plan will provide take authorization for projects and activities associated with implementation of the Plan's conservation strategy as described in detail in Chapter 5 and summarized below. Most of these activities will take place within the Reserve System assembled by the Plan. Some conservation activities may also occur outside of the Reserve System on public or private lands (see Chapter 5 for a description of all conservation actions).

All conservation actions will take place within the Habitat Plan permit area and the Expanded Study Area and permit area for Burrowing Owl Conservation (**Figure 1-2**), except for the possibility that land will be acquired at the mapped boundary of the Habitat Plan permit area. On parcels acquired for the Reserve System that extend beyond the mapped permit area boundary, management, restoration, and monitoring activities are covered on the entire parcel within unmapped portions of the permit area as long as more than half of each parcel is located within the permit area. These covered activities would occur on no more than a total of 250 acres.

Management Activities

This category includes all management actions required by the Plan or other actions that might be necessary to achieve Plan biological goals and objectives. This category includes construction, maintenance, and use of facilities needed to manage the Reserves, including but not limited to Reserve field offices, maintenance sheds, carports, roads, bridges, culverts, fences, gates, wells, stock tanks, and stock ponds. All Reserve management structures will be constructed to minimize impacts on covered species and vegetation communities and in compliance with the conditions on covered activities described in Chapter 6. Facilities existing at the time of land acquisition will be used whenever feasible.

Management actions that will be used within the Reserve System are described in detail in Chapter 5 *Conservation Strategy*. Actions not already described earlier in the chapter may include but are not limited to the activities listed below. Many of these activities overlap.

- Vegetation management using livestock grazing, manual labor, and/or prescribed burning. Pesticide use is permitted under the Plan only to achieve biological goals and objectives (e.g., exotic plant or exotic animal control), in accordance with label instructions, and in compliance with state and local laws. Pesticide use is covered only under the NCCP Act permit, not the ESA permit. Implementation of integrated pest management programs established by the local jurisdictions is only a covered activity if pesticides are used to achieve exotic plant or exotic animal control. Any pesticide use must comply with all existing injunctions related to the use of pesticides. For example, the October 2006 stipulated injunction disallows the use of certain pesticides within habitats and buffer zones established around certain habitats for California red-legged frog and the May 2010 stipulated injunction disallows the use of certain pesticides within habitat and buffer zones established for California tiger salamander, San Joaquin kit fox, and Bay checkerspot butterfly.

- Seed collection from covered plant species for depositing in a seed bank.
- Development of field facilities for workshop space and tool and machinery storage.
- Construction, rehabilitation, and maintenance of facilities (e.g., corrals, fencing, gates, feed storage, water delivery) to support livestock grazing as a covered species management tool.
- Maintenance of existing roads and of new roads constructed for the Reserve System, including grading and relocation of roads to protect sensitive resources.
- Translocation of covered species. See Chapter 5 for details.
- Demolition or removal of structures, roads, or man-made livestock ponds to increase public safety or to restore habitat.
- Use of motorized vehicles for patrolling, maintenance, and resource management activities in the Reserve System.
- Use of mechanized equipment for construction, maintenance, and resource management projects in the Reserve System
- Control of nonnative species (e.g., feral cats and dogs, nonnative pigs, red fox, nonnative fish, bullfrogs, barred tiger salamanders, and hybrids[23]).
- Management activities for burrowing owls such as population augmentation, and owl relocation for conservation purposes.
- Stream maintenance for habitat purposes.
- Installation of wells, the water from which will be used to fill stock ponds or provide water sources for cattle. Up to 49 wells will be installed and placed in close proximity to ponds that they will serve. Wells will be installed only as necessary for natural resource management purposes and when no alternative surface water supplies are available. Wells will be sited so that they do not affect seeps or springs and will not degrade surrounding habitat.
- Surveys and monitoring for mitigation and restoration/habitat enhancement projects.
- Fire management including prescribed burning, mowing, and fuel-break establishment and maintenance.

[23] See Chapter 5, Section 5.4.2 and **Appendix K**.

- Hazardous materials remediation, such as appropriate closure of underground storage tanks, soil remediation, cleanup of illegal dumping, etc.
- Repair or replacement of existing facilities damaged by floods fire, or earthquake.
- Operations related to water delivery for ponds and other aquatic habitat.
- Water delivery for use in operations facilities (e.g., field facilities and the native plant nursery).

Access to the Reserve System to conduct maintenance, as well as habitat enhancement, restoration and creation projects, will likely require the construction of new roads and bridges. This Plan covers the construction of up to 40 miles of new dirt road and 5 new vehicular bridges within the Reserve System over the permit term. It is not expected that many areas of paved roads will be necessary in the Reserve System and as such, no assumptions for paved roads are included in the impact analysis. However, if the Implementing Entity determines that a certain area requires paving, this would be covered under the Plan, up to 5 miles. To support maintenance activities, it is assumed that approximately 1 well per 1,000 acres of Reserve System will be required and that 53 miles of new fencing will be constructed.

Public Access and Recreation in the Reserve System

Limited public access and recreational use of Plan reserves is permitted under the guidelines of this Plan (see Chapter 6 for details). To the extent possible, recreational facilities will utilize existing infrastructure such as existing trails and fire or ranch roads. The construction of up to 126 miles of new trails and 25 new trail creek crossings within the Reserve System is assumed in the impact analysis. One new trailhead facility, up to 5.0 acres each, is assumed for every 5,000 acres of newly acquired lands in the Reserve System (not including existing open space incorporated into the Reserve System), resulting in approximately seven new trailhead facilities or 35 acres. It is estimated that new signage will affect 0.25 acre per 1,000 acres of Reserve System.

Covered activities also include the construction and maintenance of recreational facilities such as trails, creek crossings for trails, parking areas, gates, fencing, signage, restrooms, wildlife observation platforms, and educational kiosks that are built and/or used in accordance with the guidelines in this Plan. The Permittees are covered for incidental take of covered species resulting from appropriate public use of trails and parking lots within the permit area, inside or outside of the designated Reserve System, provided that usage is consistent with the guidelines in this Plan. The permits do not cover off-trail recreational activities or any type of activity prohibited by this Plan or by state or federal law.

Up to eight new staging areas, eight new small day-use picnic areas, and three new small backpack camps and their associated staging areas may be allowed within the Reserve System. Picnic areas shall be limited to eight standard picnic benches, restrooms, potable water and trash receptacles. Up to three new backpack camps to provide low-use, remote camping opportunities within the Reserve System are also covered. These camps will provide restrooms, potable water and trash receptacles.

Habitat Enhancement, Restoration, and Creation

The Plan conservation strategy (see Chapter 5) sets forth requirements for habitat enhancement, restoration, and creation. Enhancement activities generally fall under the reserve management category. Habitat restoration and creation will generally be disruptive only in the short term because these activities may involve soil disturbance, removal of undesirable plants, and limited grading. All habitat restoration and creation is expected to result in a net long-term benefit for covered species and natural communities. However, these activities may have temporary or short-term adverse effects and may result in limited take of covered species (see Chapter 4 *Impact Assessment and Level of Take*). All habitat enhancement, restoration, and creation activities conducted within Plan reserves that are consistent with the requirements of this Plan are covered by the permits. Habitat enhancement, restoration, and creation activities may also be conducted outside Plan reserves. If such activities occur and are consistent with this Plan, they are covered by the permits. Examples of such activities include restoration projects conducted as mitigation that require additional coverage beyond the self-mitigating aspects inherent to most mitigation projects or restoration of unauthorized trails outside of the Reserve System. Examples of habitat enhancement, restoration, and creation activities include, but are not limited to, the following.

- Pond creation.
- Restoration projects in streams, riparian areas, wetlands, and uplands.
- Native vegetation planting.

Species Surveys, Monitoring, and Research

Biologists will need to conduct surveys for covered species, natural communities, and other resources within the Plan reserves on a regular basis for monitoring, research, and adaptive management purposes. These surveys may require physical capture and inspection of specimens to determine identity, mark individuals, or measure physical features, all of which may be considered take under ESA or CESA. Surveys for covered species will also be conducted on private land being considered for acquisition for the Plan. Although these surveys are not expected to require as much handling of specimens, take may still occur. Surveys for all covered species will be conducted by qualified biologists, as defined in Chapter 6. All such survey activity consistent with this Plan is covered by the ESA and NCCP permits.

Research conducted by biologists on Plan reserves in support of the Plan is covered by the permits as long as the research projects have negligible effects on populations of covered species. These researchers must be under legal contract with the Permittee(s) and/or have a Section 10(a)(1)(A) recovery permit to cover incidental take that may occur as a result of research conducted on reserve lands (see Chapter 6 for a more detailed description of a "qualified biologist"). Research on Plan reserves unrelated to the Plan is not covered by the permits because the nature and impacts of these future research projects cannot be predicted at this time. Such researchers would be granted access on a case-by-case basis and such access will be conditioned on compliance with stated restrictions. Research conducted outside of the permit area in support of the Plan's conservation strategy is also not covered by the Plan (e.g., translocating western burrowing owls into the study area from outside the study area). This research will require coordination and possible permitting from the Wildlife Agencies.

Emergency Activities

An emergency is a situation involving disasters, casualties, national defense, or security emergencies and includes response activities that must be taken to prevent imminent loss of human life or property (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998). The Wildlife Agencies will not obstruct an emergency response decision made by the Permittees, where human life is at stake. With the exception of changed circumstances addressed in Chapter 10 *Assurances* take associated with emergencies are not covered by the Plan and associated permits.

Responses to changed circumstances within Plan reserves that may affect populations of covered species are covered under this Plan. Foreseeable emergency activities include, but are not limited to, the following.

- Firefighting of small wildfires or structure fires.
- Evacuation of injured persons or livestock.
- Remediation and cleanup of spills or illegal dumping.
- Remediation, cleanup, and restoration of illegal cultivation activities (e.g., marijuana farms).
- Use of motorized vehicles and mechanized equipment for conducting emergency activities.
- Repair of existing facilities damaged by floods, fire, earthquakes, or other natural disasters.

Responses to emergency activities that have substantial effects on covered species (e.g., firefighting for a large wildfire or repair after a major flood) are considered changed circumstances and are described in Chapter 10.

Neighboring Landowners Protection Program

The implementation of conservation measures described in Chapter 5 *Conservation Strategy* may increase populations of covered species within Plan Reserves. As a result, some individuals may disperse to neighboring private lands where the presence of listed species could interfere with routine agricultural activities. Protections for neighboring landowners are described in Chapter 10; the methods for establishing and estimating take associated with this program are described in Chapter 4. With certain provisions and restrictions, farmlands within 1 mile of the Reserve System boundary are eligible for take coverage during the course of routine agricultural activities, during the permit term, and for take beyond the baseline condition that existed prior to the establishment of the neighboring Plan reserves. Take coverage for this program is limited to three covered species: California red-legged frog, California tiger salamander, and western pond turtle. For definitions and details of this program, see Chapters 4 and 10.

2.4 Projects and Activities Not Covered by this Plan

As described above, this Plan strives to cover all projects and activities for which the Permittees envision the need for incidental take coverage over the permit term. However, certain projects and activities that may occur in the permit area over the permit term are not appropriate for coverage under this Plan due to a variety of factors including, but not limited to, lack of information, speculative nature of the project, existing permits, obtaining permits under a separate program, or the risk that the project or activity is incompatible with the Plan's conservation strategy. The projects and activities listed below were considered, but rejected for coverage under this Plan.

- **Private sector activities that do not obtain a development, grading, building, or other construction permit.** Construction permits involve land disturbance for the purposes of making land improvements, such as the construction of buildings, roads, and driveways ("building permits" referenced herein do not include plumbing, electrical, or mechanical permits). Activities that do not obtain these development permits are not covered by the Plan.
- **SCVWD Stream Maintenance Program.** The Stream Maintenance Program was developed to streamline the permitting process for routine stream maintenance activities, thus allowing SCVWD to continue preserving the existing level of flood protection of streams and water-delivery function of canals in the County in an efficient manner. The Stream Maintenance Program was authorized in 2002 and the impact analysis of the program was based on a 20-year study period. Permits received under the program include: Section 7 biological opinions from NMFS and USFWS through the Section 404 Permit, CDFG 1601 Streambed Alteration Agreement, Regional Board Waste Discharge Requirements Permits (Central Coast and San

Francisco Bay Regional Boards), and a San Francisco Bay Conservation and Development Commission (BCDC) permit.

The Stream Maintenance Program provides coverage for the following activities on streams for which SCVWD has maintenance responsibilities.

- Vegetation management for in-stream and upland areas. Management is done using herbicide and mechanical techniques.
- Sediment removal to return engineered channels to as-built conditions.
- Bank protection for erosion control.
- Minor maintenance activities that avoid significant impacts requiring mitigation. This category includes such activities as graffiti removal, repair of structures with in-kind materials within the existing footprint, and tree pruning along maintenance roads and fence lines to provide access and to remove hazards.

Under the Stream Maintenance Program, routine maintenance is undertaken with consideration of special-status species that may be affected by the activities. Detailed BMPs were developed (and are continually updated through adaptive management) to reduce impacts from program activities, including potential impacts on special-status species. Even after application of BMPs, the program results in significant impacts. Thus, SCVWD is responsible for mitigation associated with its maintenance activities.

As mitigation for the Stream Maintenance Program, SCVWD proposed and obtained approval for a mitigation package that includes restoration of 30 acres of tidal wetlands, creation of 14 acres of freshwater wetlands, purchase of approximately 1,000 acres in the upper watershed areas for stream and watershed protection, and implementation of 125 acres of giant reed (*Arundo donax*) control including removal and follow-up monitoring and removal. Lands restored or purchased will be preserved in perpetuity as open space. In addition, mitigation for bank protection projects is calculated separately for each project. Mitigation is based on the table of ratios in Appendix E of the Stream Maintenance Program document.

The Stream Maintenance Program provides incidental take coverage for five federally listed species, three of which are also covered by this Plan[24]. Existing permits also address impacts on waters of the United States and waters of the state. The current permits are written for 10 years, expiring in 2012. However, the program is anticipated to provide regulatory coverage for federally listed species through 2022. At that time, additional impact analysis of activities would be required to determine whether new significant impacts would result from ongoing routine maintenance. This analysis is needed for negotiation of extensions for the Stream Maintenance Program permits. Because these activities already have endangered species coverage under the Stream Maintenance Program permits, they do not require coverage under the Habitat Plan and will therefore not be covered by this Plan.

[24] Bay checkerspot butterfly, California red-legged frog, least Bell's vireo, salt marsh harvest mouse, and western snowy plover are covered by SCVWD Stream Maintenance Program; the first three are also covered by this Plan.

- **City of Gilroy expansion beyond the Plan's planning limit of urban growth.** The Gilroy General Plan (2002) (City of Gilroy 2002a) designates a number of areas outside the 20-year planning boundary as future areas for development and open space (W. Faus pers. comm.). Policy 2.11 of the Gilroy General Plan designates two areas outside its 20-year planning boundary (the boundary used as the planning limit of urban growth for the purposes of this Plan) as potential areas for future development. These areas are described below.
  - The area north of Day Road, west of Santa Teresa Boulevard, and east of the foothills. This area is suitable for long-term residential expansion and related development.
  - The area east of U.S. 101 between Buena Vista and Masten Avenue, bordering on the highway. This area is suitable for long-term expansion of highway-oriented commercial development.

  Impacts associated with expansion of urban development into these areas were not assessed for this Plan and are not a covered activity of this Plan.
- **Bay Area to Central Valley high-speed train.** The Federal Railroad Administration and the California High Speed Rail Authority are currently planning the San Francisco Bay Area to Central Valley portion of the California High-Speed Train System (70 FR 71370–71372). The proposed alignment for the High-Speed Train System through Pacheco Pass traverses the Plan study area. It is possible that portions, or all, of this alignment could be constructed during the permit term. In such a case, this project would not be covered under this Plan.
- **New highway between I-5 and U.S. 101.** The Metropolitan Transportation Commission's 2030 Regional Transportation Plan lists a "limited-access 4-lane facility and partial new alignment between I-5 and U.S. 101 (possible toll road)" (Metropolitan Transportation Commission 2005). The Regional Transportation Plan does not discuss this project in any detail but provides a preliminary budget of $432 million. Should this project be pursued during the life of the Plan permit, it would not be covered under the Plan.
- **Routine and ongoing agricultural activities.** Routine and ongoing agricultural activities that do not go through a County or city permitting process (e.g., a grading and/or building permit) would not be subject to local approval and therefore cannot be covered by the Plan. Routine agricultural activities are defined broadly as activities that occur in the normal course of existing farming or ranching operations, including crop planting, crop harvesting, livestock management, and pesticide application. These activities are not covered by the Plan, with the exception of the Neighboring Landowners Protection Program described above and in Section 10.2.7 *Assurances for Private Landowners*.

  New intensive agricultural activities such as cut flower nurseries, Christmas tree farms, ornamental plant nurseries, dairies, and feedlots are not covered by this Plan unless these activities receive permits from the County. The conversion of agricultural lands to non-agricultural uses are covered by this Plan as described above in this chapter.

- **Expansion of cultivated agriculture into natural lands.** The expansion of cultivated agriculture into natural lands (as defined by the natural land cover types described in Chapter 3) is not covered by this Plan unless it receives a development or grading permit. This category typically applies to new large-scale agricultural operations such as row crops, vineyards, or orchards. If these land conversions do not require grading, they would typically not require local approvals by the Permittees and therefore cannot be covered by the Plan.
- **Vineyard development that is not assessed by the County through a County permit process**. The creation of new vineyards or expansion of existing vineyards that does not go through a County permitting process (e.g., a grading and/or building permit) would not be subject to local approval and therefore cannot be covered by the Plan. The growth of private and commercial vineyards in Santa Clara County is expected to be low during the permit term, but impacts from vineyards may be significant and incompatible with the conservation strategy. Vineyard impacts include sediment runoff to streams and reductions in local groundwater.
- **Timber harvest operations.** In 2004, approximately 67,000 board feet of timber were harvested in Santa Clara County, down by 40% from 2003 (County of Santa Clara, Division of Agriculture 2005). Most of this harvest occurs on private lands in the Santa Cruz Mountains. Due to the potentially extensive impacts associated with timber harvesting, the lack of understanding about what future projects might be proposed, and the need for some sites to acquire State timber harvesting permits, timber harvesting will not be covered by the Plan.
- **Quarries and other mining other than expansion of Freeman Quarry.** Quarries and other mining were considered for inclusion in this Plan. At the time of Plan development, only one specific project was proposed, the Freeman Quarry expansion. Due to the potentially extensive impacts associated with quarries and mining and the lack of understanding about what future projects might be proposed, the mining of sand or other aggregate material, or the mining of precious metals or other minerals is not covered by this Plan other than for the Freeman Quarry expansion. This exclusion does not include gravel augmentation conducted to enhance fish habitat (described above under Three Creeks HCP conservation strategy) or mining activities associated with the borrow sites for seismic retrofits of dams as described in Section 2.3.3 *In-Stream Capital Projects*. Project proponents who propose any quarries or mining operations in the future in Santa Clara County are recommended to review the 2004 NMFS National Gravel Extraction Guidance for recommendations on how to conduct such activities in and near anadromous fish–bearing streams.
- **New and expanded landfills other than Kirby Canyon, Pacheco Pass Landfill expansions, and landfills occurring inside the planning limits of urban growth of the three cities.** Development of new or expanded landfills was considered for inclusion in this Plan. At the time of Plan development, no specific projects were proposed for inclusion beyond the Kirby Canyon and Pacheco Pass Landfill expansions. Due to the potentially extensive impacts associated with new or expanded landfills and a lack of

understanding about what future projects might be proposed, the development of new or expanded landfills is not covered by this Plan. This does not apply to the expansion of Z Best Composting facility, which is considered a recycling facility under County ordinance.

- **Mercury removal/remediation.** Mercury removal/remediation projects other than those described in Section 2.3.4 *In-Stream Operations and Maintenance* are not covered activities under this Plan. Mercury removal that occurs in the course of sediment removal or dredging projects is covered by the Plan (i.e., projects whose primary purpose is sediment removal, not mercury remediation).

- **Corps led projects**. Projects that are led by the Corps (i.e., the Corps has control over design, avoidance and minimization measures, and mitigation), including levee and flood protection projects, are not covered activities under this Plan. These projects will require a separate Section 7 consultation associated with the Clean Water Act Section 404 permit application process.

- **Pacheco Dam reconstruction and reservoir enlargement.** SCVWD may in the future enlarge Pacheco Reservoir by rebuilding Pacheco Dam or constructing a new dam on Pacheco Creek with substantially more storage. This is one option for SCVWD to respond to the increasing unpredictability and unreliability of water supply in the study area. The project would be located on Pacheco Creek, approximately 1.5 miles upstream of the existing North Fork Dam near the upstream end of Lake Pacheco. Detailed design of this project has not yet begun, nor would it begin for several years to decades. This project is not a covered activity in the Habitat Plan. However, the Plan describes a special major amendment procedure and conservation strategy for terrestrial covered species that could be used by SCVWD if and when this project is proposed. See Chapter 10, Section 10.3.3 *Major Amendments*, for the details of this special amendment process for this project.

- **Pesticide/herbicide application for the federal permit.** Pesticide and rodenticide use is not an activity permitted by USFWS and will not be covered under this Plan for the federal permits. All applicable injunctions stipulated during plan implementation (i.e., 2006 California red-legged frog Stipulated Injunction) will be adhered to until formal consultation between the EPA and USFWS regarding the effects of pesticides on listed species is concluded. This activity is covered under the state permit.

- **Installation and operation of groundwater wells.** The Local Partners do not have a clear regulatory authority over the location of groundwater wells nor water rights associated with wells. In addition, it is very difficult to assess the impacts associated with groundwater well operation. Therefore, except as described above for open space and stream flow management, installation and/or use of groundwater wells will not be a covered activity of this Plan.

- **Increased development due to incorporation of San Martin.** Development associated with the future incorporation of San Martin and subsequent changes to land use and zoning that would allow denser, or urban, development was not evaluated under this Plan and is not a covered activity.

- **Dam removal and/or construction of new dams.** Dam removal and/or construction of new dams are not covered activities under this Plan.
- **Wind farm development.** Construction and operation of wind farms is not a covered activity under this Plan.
- **Water importation from outside the SCVWD service area.** Importing water from outside of the service area of the SCVWD (County boundary) is not covered under this Plan. The primary source of imported water outside of the County is the Delta, and effects to Delta species were not analyzed in this Plan. Effects associated with imported water from the Delta are currently being evaluated under a Section 7 consultation with the Bureau of Reclamation.
- **Emergency activities not defined as a Changed Circumstance in Chapter 10.** During the permit term, the Local Partners and those under their jurisdiction may need to respond to emergencies, as defined in Section 2.3.8, above. The Wildlife Agencies will not obstruct any emergency response decisions made by the Local Partners. Existing consultation regulations will apply to emergency activities (50 CFR 402.05).

Table 2-1. Proposed Land Use Categories and Associated General Plan Land Use Designations

Habitat Plan Category	County of Santa Clara	City of Gilroy	City of Morgan Hill	City of San José
Urban Development	Major Gas & Electric Utilities Major Public Facilities Roadside Services Transportation Major Educational & Institutional Uses	Hillside Residential (0.5-4 DU[a]/acre) Low Density Residential (3-7.25 DU/acre) Medium Density Residential (8-16 DU/acre) High Density Residential (16-30 DU/acre) Neighborhood District (6-12.5 DU/acre) Neighborhood Commercial Professional Office Shopping Center Commercial Highway Commercial Commercial Industrial Downtown Specific Plan Districts Campus Industrial Limited Industrial General Industrial Park/Public Facilities	Residential Estate (0-1 DU/acre) Single Family Low (1-3 DU/acre) Single Family Medium (3-6 DU/acre) Single Family High (5-10 DU/acre) Multi Family Low (5-14 DU/acre) Multi Family Medium (14-21 DU/acre) Multi Family High (21-40 DU/acre) Commercial General Commercial Non–Retail Commercial Mixed Use Industrial Office Industrial Campus Industrial Public Facilities Rural County (usually 1 DU/5-20 acres)[b]	Estate Residential (1.0 DU/acre) Very Low Density Residential (2 DU/acre) Low Density Residential (5 DU/acre) Medium Low Density Residential (8 DU/acre) Medium Density Residential (8-16 DU/acre) Medium High Density Residential (12-25 DU/acre) High Density Residential (25-50 DU/acre) Transit Corridor Residential (20+ DU/acre) Transit/Employment Residential District: 55+ DU/acre Residential Support for the Core Area (25+ DU/acre) Planned Community Urban Reserve (future development) Mixed Use Overlay Mixed Industrial Overlay Neighborhood/ Community Commercial Regional Commercial General Commercial Core Area Combined Residential/Commercial Office Transit–Oriented Development Corridor Industrial Park Administrative Office/Research & Development

Table 2-1. Continued

Habitat Plan Category	County of Santa Clara	City of Gilroy	City of Morgan Hill	City of San José
				Research/Development Campus Industrial Light Industrial Heavy Industrial Combined Industrial/ Commercial Industrial Core Airport Approach Zone Public/Quasi–Public
Rural Residential	Rural Residential (1 DU/5-20 acres)	Rural Residential (maximum of 1 DU/2.5 acres) Hecker Pass Special Use District		Rural Residential (1 DU/5 acres) Urban Hillside (1 DU/5 acres)
Ranchland	Ranchlands (1 DU/20-160 acres) Hillsides (1 DU/20-160 acres)			Non–Urban Hillside (1 DU/20-160 acres)
Agriculture	Agriculture Large Scale Agriculture Medium Scale	Agricultural Commercial Agri–tourist Commercial Agri–tourist Commercial Overlay		Agriculture Coyote Greenbelt Overlay
Urban Parks and Open Space		Open Space (in part) Park/Recreation Facility	Open Space (in part)	Public Park/Open Space (in part) Private Open Space (in part) Private Recreation (in part) Floating Park overlay
Rural Parks and Open Space	Baylands Open Space Reserve Other Public Open Lands Regional Parks, Existing	Open Space (in part)	Open Space (in part)	Public Park/Open Space (in part) Private Open Space (in part) Private Recreation (in part)

Notes

[a] DU = dwelling units

[b] Morgan Hill anticipates that existing land use designations of Rural County, currently falling within the development density for the Rural Residential land use category, will, over the course of the permit term, become denser. Therefore Morgan Hill's Rural County land use designation is included in the Urban Development land use category for this Plan.

Table 2-2. Significant Open Space or Parkland Areas within the Study Area[a]

Open Space or Parkland	Primary Ownership (acres)	Other Ownership	Total Acres	Total Acres in Study Area
(unnamed parcels)	United States Bureau of Land Management		1,025	989
Cañada de los Osos Ecological Area (formerly Stevenson Ranch)	California Department of Fish and Game		4,200	4,200
Almaden Quicksilver County Park	County of Santa Clara Parks and Recreation Department (3,943)	SCVWD owns 209 acres	4,152	4,138
Anderson Lake County Park	County of Santa Clara Parks and Recreation Department (1,773)	SCVWD owns 1,339 acres	3,144	3,144
Calero County Park	County of Santa Clara Parks and Recreation Department (2,603)	SCVWD owns 890 acres	4,455	4,442
Coyote Creek Parkway	County of Santa Clara Parks and Recreation Department (1,613)	SCVWD owns 81 acres	1,694	1,694
Coyote Lake-Harvey Bear Ranch County Park	County of Santa Clara Parks and Recreation Department (3,663)	SCVWD owns 932 acres	4,595	4,595
Ed R. Levin County Park	County of Santa Clara Parks and Recreation Department (1,541)		1,541	973
Joseph D. Grant County Park	County of Santa Clara Parks and Recreation Department (9,560)		9,560	9,560
Motorcycle County Park	County of Santa Clara Parks and Recreation Department (442)		442	442
Mount Madonna County Park	County of Santa Clara Parks and Recreation Department (3,677)		3,677	3,669
Santa Teresa County Park	County of Santa Clara Parks and Recreation Department (1,568)	SCVWD owns 9 acres	1,646	1,646
Uvas Canyon County Park	County of Santa Clara Parks and Recreation Department (1,133)		1,133	1,127
Palassou Ridge Open Space Preserve	Santa Clara County Open Space Authority		3,515	3,515
Rancho Cañada del Oro Open Space Preserve	Santa Clara County Open Space Authority		3,602	3,602

Open Space or Parkland	Primary Ownership (acres)	Other Ownership	Total Acres	Total Acres in Study Area
Sierra Vista Open Space Preserve	Santa Clara County Open Space Authority		1,676	1,676
Mitigation site	Santa Clara Valley Transportation Authority		603	603
Alum Rock Park	City of San José		703	703
Kirby Landfill easement	City of San José		250	250
Coyote Ridge Ecological Preserve	Silicon Valley Land Conservancy		95	95
Tulare Hill Ecological Preserve	Silicon Valley Land Conservancy		116	116
Blue Oak Ranch Reserve	University of California Natural Reserve System		1,319	706
Romero Ranch	The Nature Conservancy		28,781	10,674
San Felipe Ranch (conservation easement)	Easement held by The Nature Conservancy		28,359	24,983
Silacci Ranch (conservation easement)	Easement held by The Nature Conservancy		1,388	1,388

Sources: Santa Clara County Open Space Authority 2005, 2012; Silicon Valley Land Conservancy 2006; County of Santa Clara, Parks and Recreation Department 2006a; County of Santa Clara, Parks and Recreation Department 2006b; The Nature Conservancy 2006.

Notes:

[a] Significant open space or parklands are large areas or highly biologically valuable that may support the Plan's conservation strategy.

Table 2-3. Examples of Open Space Types[a] in the Study Area

Type 1 Open Space	Type 2 Open Space	Type 3 Open Space	Type 4 Open Space
• Properties under easement managed by The Nature Conservancy • Santa Clara Valley Open Space Authority properties under easement or other protections from change in land use • Designated biological mitigation sites under easement • Private property under conservation easement with the primary purpose of ecological protection	• Santa Clara Valley Water District watershed protection areas • Santa Clara Valley Open Space Authority properties without permanent protections or where protections are uncertain or pending • City of San Jose rural parks and open space • San Francisco Public Utilities Commission watershed lands • Bureau of Land Management properties	• Santa Clara County Parks and Recreation Department rural parks • Santa Clara County historic sites or recreation areas • Santa Clara County urban creek parks	• Private properties under agricultural easement (cropland) • Golf courses • Urban parks or open space owned by cities

Notes:

[a] See Figure 2-3 and Chapter 2 for definitions of open space types.

Table 2-4. Dry and Wet Season Maximum and Minimum Covered Reservoir Dewatering Flows for SCVWD Reservoirs for the Purpose of Triggering Additional Wildlife Agency Approval Requirements

Reservoir	Allowable Daily Dewatering Flows (cfs)[1]			
Dry Season (May 1 to October 31, 184 days)	Minimum[2]	Average[3]	Maximum	Outlet Capacity (cfs)
Almaden[4]	1	5	10	190
Anderson[5]	3	50	50	100 (550)
Calero[4]	1	15	20	75
Coyote[4]	2	34	49	450
Guadalupe[5]	1	10	10	235
Chesbro	1	10	20	740
Uvas	1	32	39	165
Wet Season (November 1 to April 30, 181 days)	Minimum	Average[3]	Maximum[7, 8]	Outlet Capacity (cfs)
Almaden[4]	1	59	190	190
Anderson[5,6]	5	467	550	100 (550)
Calero[4]	1	31	75	75
Coyote[4]	2	202	450	450
Guadalupe[5]	1	28	235	235
Chesbro	1	79	740	740
Uvas	2	165	165	165

Notes:

1 Flows are based on one year dewatering program beginning May 1 with a dewatered reservoir by April 30. Average flows are those releases that can dewater the reservoir in the one year timeframe and are based on wet year conditions beginning with a full reservoir (Scenario 3).

2 Minimum flows are provided for lower limit to indicate no stream dry-back.

3 Average flow is based on the daily average flow over the entire period during which the reservoir is dewatered beginning with a full reservoir on May 1 and an inflow of 10% exceedance probability.

4 Reservoirs with fish management objectives.

5 Reservoirs with cold water and fish management objectives.

6 Maximum winter flow releases could be made per the flood rule curves, per DSOD restriction, pulse flows, or when they mimic natural hydrology.

7 Anderson Dam flows between 100 cfs and 550 cfs can be made by delivering water to treatment plants in addition to releasing water to the stream. Pumping would be required.

8 Pulse flows implemented for the benefit of anadromous fish species (see Section 2.3.4) may be greater than the flows anticipated for draining of a reservoir as part of a dewatering event. These higher flows are also covered by this Plan. Implementation of pulse flows may require additional regulatory approval (i.e., NMFS and CDFG for federal- and state-listed fish species).

Table 2-5. Existing Interim Storage Restrictions for SCVWD Dams

Dam	DSOD Storage Restrictions as of October 31, 2011[1]
Almaden Dam	20%
Anderson Dam	31%
Chesbro Dam	none
Coyote Dam	48%
Calero Dam	54%
Guadalupe Dam	35%
Uvas Dam	none
Vasona Dam	none

[1] Percentages reflect reduction in current reservoir capacity, not new operating capacity.

Source: Arnold pers. comm.; Showalter pers. comm., D. Caldon pers. comm.

Table 2-6. Specific Transportation Projects that are Covered by the Plan

Project	Approximate Length in Permit Area (miles)	Approximate Width of New Construction (feet)	Lead Agency
County Roadway Projects (includes extensions, new connections, realignments, and widenings)			
Ferguson/New North-South Corridor			
Ferguson Road widening (SR 152E to Leavesley Road)	1.8	24.0	Santa Clara County
New Avenue widening (Leavesley Road to Buena Vista Avenue)	1.4	24.0	Santa Clara County
New Avenue widening (Buena Vista to San Martin Avenue)	3.6	20.0	Santa Clara County
New Avenue realignment at approach to San Martin Avenue	0.2	46.0	Santa Clara County
Marcella/Center/Hill/Peet North-South Corridor			
Marcella Avenue widening and removal of short zig-zag in road (Leavesley Road to Buena Vista Avenue)	1.6	24.0	Santa Clara County
Center Avenue extension/new connection (Omar Avenue to Buena Vista Avenue; requires a new stream crossing)	0.2	92.0	Santa Clara County
Center Avenue widening (Omar Street to just south of Maple Avenue)	5.1	24.0	Santa Clara County
Center Avenue and Hill Road new connection at Maple Avenue	0.2	92.0	Santa Clara County
Hill Road widening (Dunne Avenue to E. Main Avenue) – along border of Morgan Hill planning limit of urban growth	1.2	24.0	Santa Clara County
Hill Road extension/new connection (East Main Avenue to Half Road and Peet Road new connection to Half Road – along border and inside of Morgan Hill planning limit of urban growth	0.6	92.0	Santa Clara County
Monterey Road North-South Corridor			
Monterey Road widening (Watsonville Road to Masten Avenue/Fitzgerald Avenue)	4.4	24.0	Santa Clara County
Santa Teresa/Hale Corridor (includes Sunnyside and DeWitt)			
Santa Teresa Boulevard widening (Castro Valley Road to 10th Street/Thomas Road) – along border of Gilroy planning limit of urban growth	1.3	24.0	Santa Clara County
Santa Teresa Boulevard widening (Day Road/Buena Vista Avenue to Watsonville Road)	5.0	24.0	Santa Clara County
DeWitt Avenue new connection to W. Edmundson Avenue and Sunnyside Avenue intersection	0.4	92.0	Santa Clara County

Project	Approximate Length in Permit Area (miles)	Approximate Width of New Construction (feet)	Lead Agency
DeWitt Avenue widening and removal of small “S” curve (North of W. Edmundson Avenue to Spring Avenue)	0.7	24.0	Santa Clara County
Hale Avenue widening (Morgan Hill planning limit of urban growth border [0.8 miles south of Tilton] to Palm Avenue	3.3	24.0	Santa Clara County
Uvas/McKean/Almaden North-South Corridor			
Uvas widening – to vary between adding center turn lane and widening shoulders (Watsonville Avenue to McKean Road/Bailey Avenue)	9.8	8.0 to 20.0	Santa Clara County
McKean Road widening (Bailey Avenue to Almaden Road) includes curve realignment at Calero Reservoir Park	4.2	24.0	Santa Clara County
McKean Road extension/new connection to Almaden Expressway – along border and inside of San José planning limit of urban growth	0.2	92.0	Santa Clara County
East-West Corridors			
Leavesley Road Widening (Ferguson Road to Marcella Avenue) – along border of Gilroy planning limit of urban growth	1.3	24.0	Santa Clara County
Masten Avenue widening (U.S. 101 to Monterey Road) – along border of Gilroy planning limit of urban growth	0.7	24.0	Santa Clara County
Fitzgerald Avenue widening (Monterey Road to Santa Teresa Boulevard) – along border of Gilroy planning limit of urban growth	0.7	24.0	Santa Clara County
Fitzgerald Avenue approach to Monterey Road, realignment 30 feet north to create a perpendicular intersection – along border of Gilroy planning limit of urban growth	<0.1	30.0	Santa Clara County
San Martin Widening (U.S. 101 to Santa Teresa Boulevard)	1.4	24.0	Santa Clara County
Interchange Projects			
U.S. 101 at Buena Vista Interchange	0.4/0.3	700	Santa Clara Valley Transportation Authority
U.S. 101 at Coyote Valley Parkway Interchange	0.2/0.4	150	Santa Clara Valley Transportation Authority
U.S. 101 at East Middle Interchange	0.3/0.3	900	Santa Clara Valley Transportation Authority
SR 152 and SR 156 Interchange	0.3/1.0	100	Santa Clara Valley Transportation Authority

Project	Approximate Length in Permit Area (miles)	Approximate Width of New Construction (feet)	Lead Agency
Highway Projects			
U.S. 101 Improvement Project (Monterey Road to SR 129; VTA ID H101-22) includes extending Santa Teresa Boulevard from Castro Valley Road to U.S. 101 (requires a new stream crossing)[1]	12.9	100	Santa Clara Valley Transportation Authority
U.S. 101 widening between Cochrane Rd. and Monterey Hwy (VTA ID H101-23)	5.1	32	Santa Clara Valley Transportation Authority
S.R. 237 HOV/HOT lane (full length inside the study area) – includes converting the existing median to express lanes	2.3	32	Santa Clara Valley Transportation Authority
S.R. 85 HOV/HOT lane (full length inside the study area) – includes converting the existing median to express lanes	11.6	32	Santa Clara Valley Transportation Authority
U.S. 101 HOV/HOT lane (western study area boundary to Cochrane Road) – includes converting the existing median to express lanes[2]	26.7	32	Santa Clara Valley Transportation Authority
U.S. 101 HOV/HOT lane (Cochrane Road to Masten Avenue; VTA ID H6) – includes converting the existing median to express lanes	7.5	32	Santa Clara Valley Transportation Authority
U.S. 101 HOV/HOT lane (Masten Avenue to 10th Street; VTA ID H7) – includes converting the existing median to express lanes	4.2	32	Santa Clara Valley Transportation Authority
U.S. 101 HOV/HOT lane (10th Street to SR 25; VTA ID H8) – includes converting the existing median to express lanes	3.0	32	Santa Clara Valley Transportation Authority
Mass Transit Projects			
Caltrain South County—double tracking from San José to Gilroy (VTA ID T6)	10.4	14	Santa Clara Valley Transportation Authority

[1] Only the portion of this project in Santa Clara County is covered by the Plan. Mitigation for the portion of the project in San Benito County could be accomplished through the Habitat Plan, consistent with the portion of the project in Santa Clara County. Mitigation required for the San Benito County portion of the project would be additive to the requirements of the Habitat Plan for the Santa Clara County portion.

[2] Only the portion of this project in the study area is covered by the Plan. Mitigation for the portion of the project outside of the study area could be accomplished through the Habitat Plan, consistent with the portion of the project in the study area. Mitigation required for the portion outside of the study area would be additive to the requirements of the Habitat Plan for the study area portion.

Sources: Santa Clara Valley Transportation Authority 2009; D. Cameron pers. comm. b.

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Figure 2-1
Santa Clara Valley Water District Water Conveyance, Treatment, and Distribution System

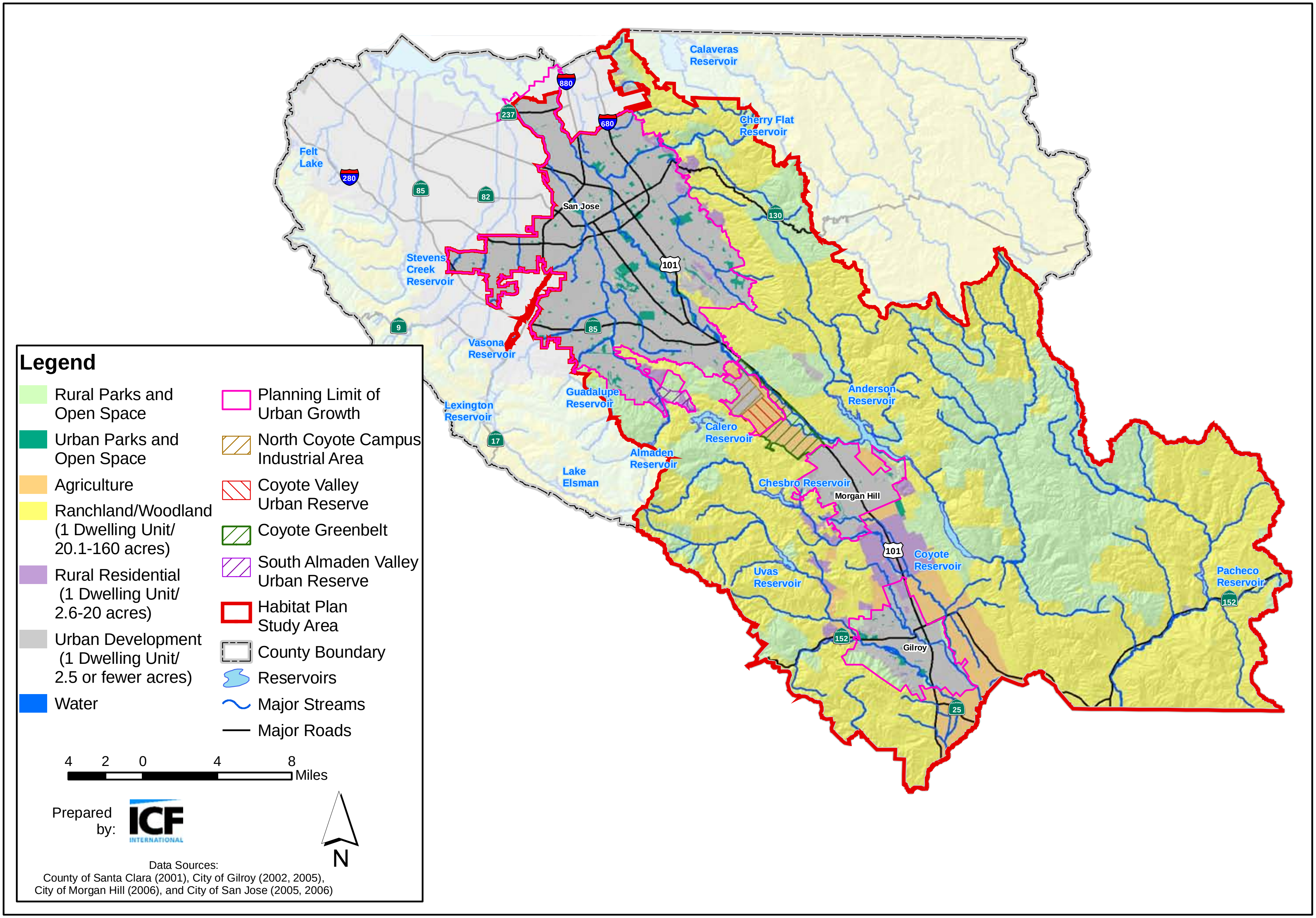

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Figure 2-2
Santa Clara Valley Habitat Plan Land Use Categories

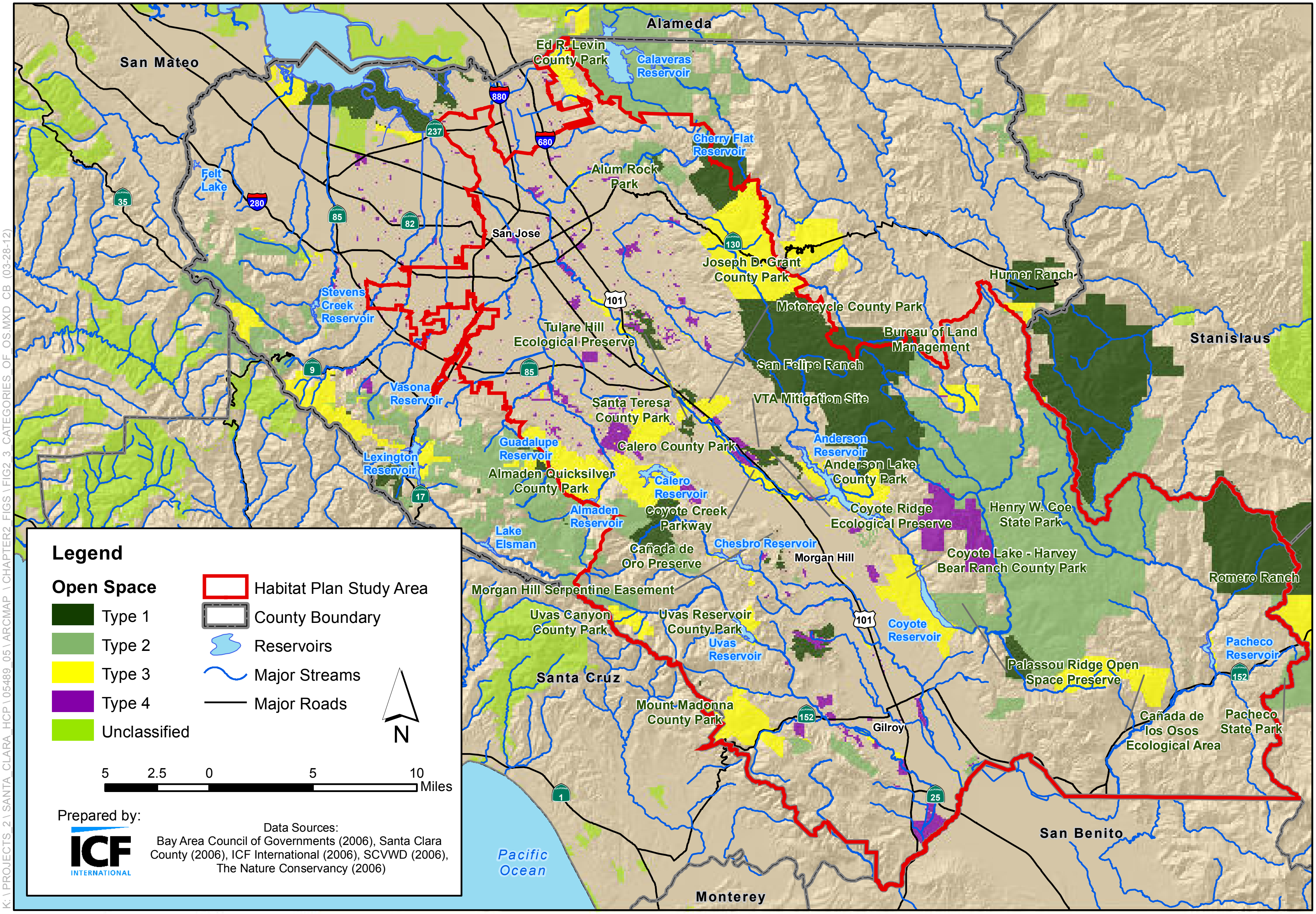
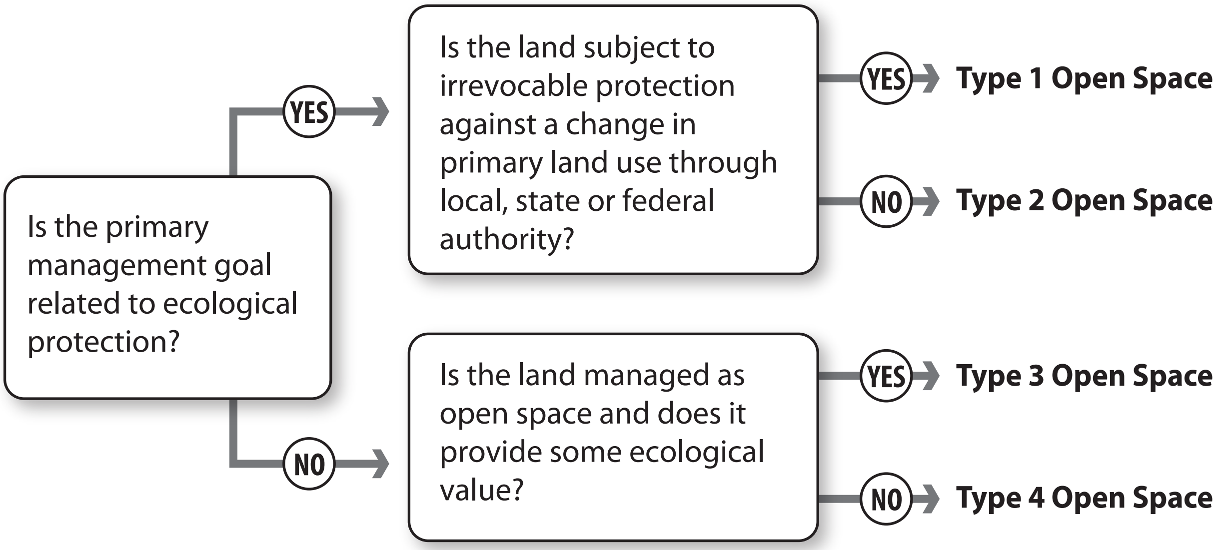


Figure 2-3
Open Space Categories in the Santa Clara Valley Habitat Plan Study Area



Criteria

Type 1 Open Space

1) The primary management goal is related to ecological protection.
2) That protection is irrevocable through local, state or federal authority and there are legal assurances such as wilderness status or a conservation easement that the primary land use will never change.

Type 2 Open Space

1) The primary management goal is related to ecological protection.
2) The land is not subject to irrevocable protection from a change in primary land use or protections are uncertain or political in nature.

Type 3 Open Space

1) Ecological protection is not a primary management goal, but land is managed as open space and has a consistent and measurable ecological value (allows multiple species to complete some portion of their life cycle [e.g. reproduction, growth, foraging] or provides critical refuge and movement opportunities [e.g. migration corridor]).

Type 4 Open Space

1) The land is undeveloped but current management goals do not promote any consistent or measurable ecological value.

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Figure 2-4
Decision Tree and Criteria for Existing Open Space Classification

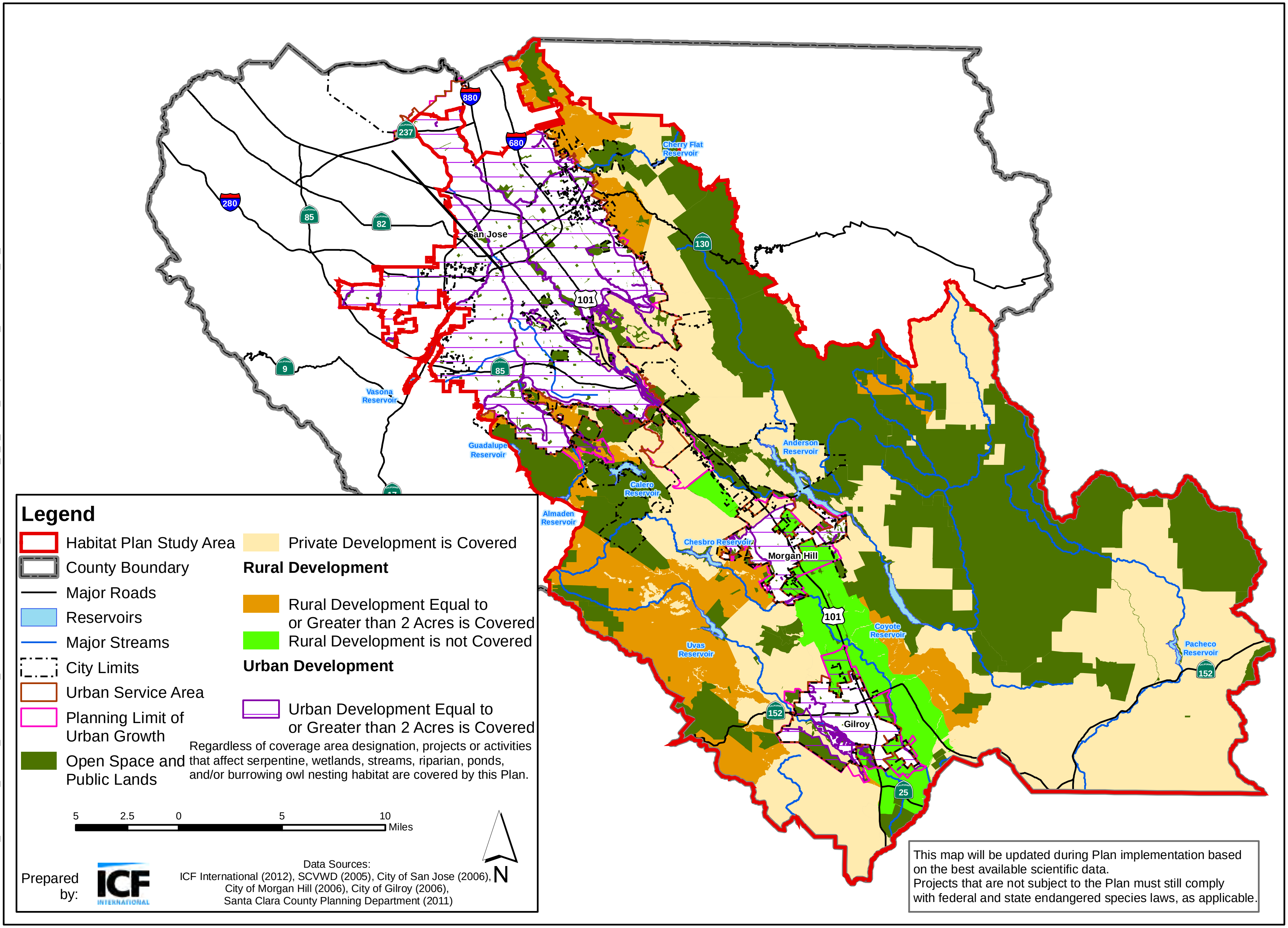

Figure 2-5
Private Development Areas Subject to the Plan

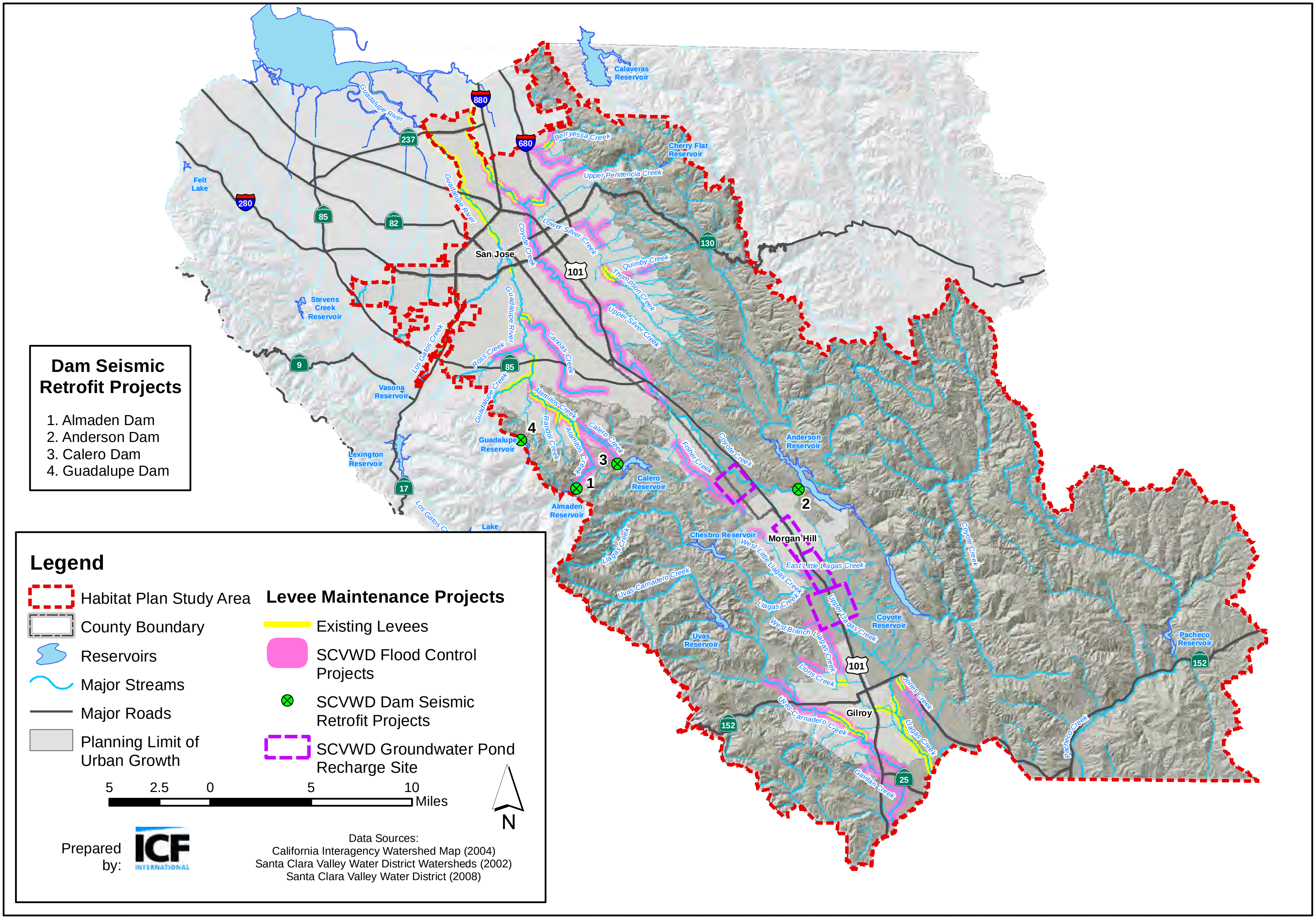

Figure 2-6
SCVWD Capital Projects

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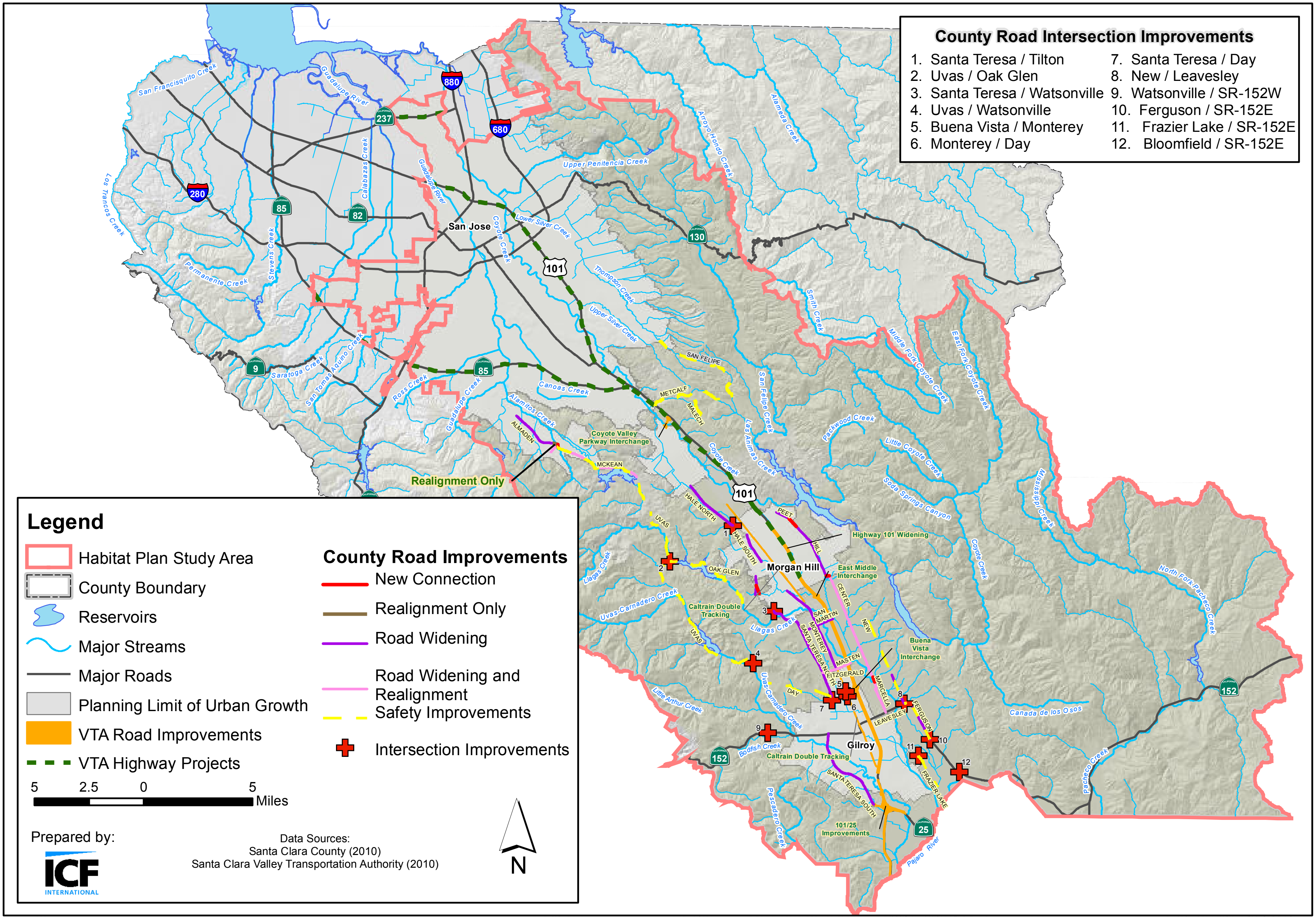

Figure 2-7
Rural Transportation Projects

Chapter 3
Physical and Biological Resources

3.1 Introduction

This chapter presents an overview of the physical and biological setting of the Plan study area. It describes the baseline physical and biological conditions upon which the impact analyses (Chapter 4 *Impact Assessment and Level of Take*) and conservation strategy (Chapter 5 *Conservation Strategy*) are based. The chapter also describes how existing data were used and new data were collected to create the baseline inventory. The physical setting of the study area is described in the context of the following subject areas.

- Location.
- Topography.
- Geology and soils.
- Climate and hydrology.
- Data sources and methods.

The biological setting of the study area is described in terms of the following subject areas.

- Land cover types.
- Associated wildlife and plants.
- Ecosystem function.
- Natural disturbances.
- Threats to each natural community.

The ecology and distribution of covered species are described along with species-habitat models that define the suitable or potential habitat for most covered species (**Appendix D**).

This chapter also explains how the land cover types, habitats, disturbances, ecosystem services, and current management of the lands are inter-related to provide a context for the management of the Reserve System described in Chapter 5.

3.2 Physical Setting

This section describes the physical setting of the study area including location, topography, geology and soils, hydrology, climate and watersheds.

3.2.1 Location

The Plan study area (519,506 acres) is located in Santa Clara County in the central California Coast Range[1]. The primary valley in the study area is the Santa Clara Valley, which stretches from San Francisco Bay to San Benito County. The Santa Clara Valley is bounded on the east by the Diablo Range, on the west by the Santa Cruz Mountains, and on the north by the San Francisco Bay shoreline. The study area excludes tidally influenced portions of the Baylands (**Figure 1-2**). For a description of the political, ecologic, and hydrologic factors used to define the study area, see Chapter 1 *Introduction*.

3.2.2 Topography

Overview

The Santa Clara Valley is the southerly, on-land portion of a regional topographic depression that includes San Francisco Bay as well as the Petaluma, Sonoma, and Napa Valleys to the north (Norris and Webb 1990). Roughly hourglass in shape, the Santa Clara Valley is approximately 11 miles wide at the southern end of San Francisco Bay, narrowing to a minimum of about 2.5 miles north of Morgan Hill.[2] The Santa Clara Valley extends south to the county line, where it widens to approximately seven miles and merges with the Bolsa and Hollister Valleys in San Benito County. The valley floor is nearly flat along the Bay, with gentle undulations and local, low hills to the south. Valley floor elevations increase from sea level in the north to approximately 350 feet above mean sea level (msl) at the valley's narrowest point north of Morgan Hill (**Figure 3-1**). This low "saddle" in the valley represents the watershed divide between the Coyote Valley Watershed in which streams flow north to San Francisco Bay, and the watersheds to the south in which streams flow south to the Pajaro River and ultimately to Monterey Bay (see *Watersheds* below for watershed descriptions).

On the west side of the valley, the Santa Cruz Mountains rise to a maximum elevation of almost 4,000 feet msl. Typical of the Coast Ranges, the range trends

[1] State Parks lands (Henry W. Coe State Park and Pacheco State Park) fall within the study area; however they are excluded from the permit area. As such, all of the land cover-based analyses in the Plan are based on the study area less State Parks lands unless otherwise noted. The size of the study area less State Parks lands is 460,205 acres.
[2] The narrowest portion of Santa Clara Valley is also referred to as Coyote Valley, and Coyote Valley is sometimes considered a separate geomorphic entity from the Santa Clara Valley. This Plan considers Coyote Valley a part of the greater Santa Clara Valley.

northwesterly and is characterized by steep, rugged slopes and abrupt, deeply incised drainages. The steepest interior portions of the range are bounded along the valley floor by more gently sloping foothills largely representing dissected alluvial fan geomorphology.

On the east side of the valley, the Diablo Range forms a similarly rugged barrier, flanked by more gently sloping but strongly dissected alluvial foothills. Like the Santa Cruz Mountains, the Diablo Range is a long, northwest-trending uplift characterized by extremely rugged topography and heights in excess of 1,000 feet. The highest peak in the range is Mt. Hamilton (4,213 feet msl), in Santa Clara County but immediately east of the study area. Other important peaks in the study area include, from north to south, Monument Peak (2,594 feet msl) at the County line, Mt. Madonna (1,897 feet msl), and Pacheco Peak (2,770 feet msl). Elevations in the study area are generally greatest within the Diablo Range, particularly in the southeast portion of the study area. The highest point in the study area is 3,777 feet msl within Henry W. Coe State Park (**Figure 3-1**). The highest point in the Santa Cruz Mountains within the study area is 3,644 feet msl (**Figure 3-1**).

Slope and Aspect

The rugged topography of the study area creates highly variable slopes and aspects. Slope may provide some insight to the type of land cover that could be present. Moreover, it is often incorporated into zoning restrictions as a function of a parcel's buildability. **Figure 3-2** shows the range and location of slope in the study area. Aspect is expressed as an azimuth (compass bearing) representing the direction normal to the plane that approximates the slope. South and southwest-facing slopes tend to receive the greatest amount and intensity of solar radiation in the study area, which can greatly influence vegetation and species occurrence. North and northeast-facing slopes are often the coolest aspects, all else being equal. Note the predominance of generally northeast- and southwest-facing slopes, consistent with the overall northwesterly trend of the ranges (**Figure 3-2**).

3.2.3 Geology

The geology and fault zones of the study area have an important influence on the distribution of landforms and soil types, which in turn influence vegetation and plant species distribution and abundance. In some cases, geology and soils also greatly influence wildlife species distribution. For example, many invertebrates are closely associated with particular plant species or vegetation types that are restricted to particular soil types and geologic substrates. On a regional scale, geologic activity has also greatly influenced the pattern of stream formation and the structure and function of local watersheds[3].

[3] Faults can also be an important source of groundwater for stream flow, particularly in droughts. In severe droughts (e.g., 1976–1977), stream reaches in or near faults were often the only local perennial stream habitat, serving as

Faulting

Topography in the study area largely reflects active tectonics associated with the fault system of the San Andreas plate boundary.

The Santa Cruz Mountains are being uplifted along a system of faults related to the San Andreas plate-boundary system (Kennedy and Hitchcock 2004). The San Andreas fault zone itself, the primary fault within the system, lies northwest along the east flank of the uplift (e.g., Wagner et al. 1991; Hart and Bryant 1997).

The western front of the Diablo Range is defined by the Hayward and Calaveras faults, both of which are active faults of the San Andreas system (Anderson et al. 1982; Wagner et al. 1991; Hart and Bryant 1997). The eastern rangefront bounding the San Joaquin Valley (i.e., the eastern edge of the Diablo Range) is also defined by faulting.

Geologic Units

Santa Cruz Mountains

The Santa Cruz Mountains uplift exposes a wide range of bedrock units in a complexly deformed series of fault slivers. These include a variety of units assigned to the Jura-Cretaceous Franciscan Complex: sandstone, greenstone, serpentinized ultramafic rocks, and small bodies of limestone. Volcanic rocks of Eocene and Miocene age and volcanic strata also of Miocene age are exposed locally. The low foothills along the eastern rangefront consist of Pleistocene alluvium recording uplift of the range (e.g., Wagner et al. 1991).

Ultramafic rocks are characterized by the occurrence of some form of ferromagnesian silicate mineral and are common throughout the world as local outcrops or large, regional formations. In the Coast Range of California, most ultramafic rocks are of the serpentinite variety. The prevailing view of the origin of Franciscan-associated sepentinites is that they are altered masses derived from the upper mantle and transferred tectonically to the earth's surface (Norris and Webb 1990). Therefore, serpentinite is often associated with southeast-to-northwest trending fault zones, as is the case in the study area. Serpentinite, and the serpentine soils derived from them, are distributed widely in California in the Coast Range from Santa Barbara County to the Oregon border and in the western Sierra Nevada foothills from Tulare to Plumas Counties (Kruckeberg 1984). Serpentine soils are particularly relevant to the ecology of the study area because they support unique species assemblages (see *Serpentine Soils* discussion below).

critical refuges for fish. Examples included: Upper Silver Creek (Silver Creek Fault), Arroyo Aguague (Calaveras Fault) as a source of flow for Upper Penitencia Creek, Coyote Creek between Coyote and Anderson reservoir (Calaveras Fault) and also downstream of Gilroy Hot Srpings (Madrone Fault), San Felipe Creek (Calaveras Fault), Bodfish Creek (Sargent Fault), and Tar Creek (Sargent Fault) (J. Smith pers. comm.).

Diablo Range

The central portion of the Diablo Range consists of mélange—locally including serpentinitic bodies—and metasandstone of the Jura-Cretaceous Franciscan Complex. Outcrops of mafic and ultramafic units (i.e., serpentinite) belonging to the Jurassic Coast Range Ophiolite are also locally present, and are particularly well developed along the active Ortigalita fault in the vicinity of Del Puerto Canyon (Wagner et al. 1991; Evarts et al. 1999).

The western Diablo rangefront is flanked by complexly faulted exposures of sedimentary strata of Cretaceous through Miocene age. These include deep marine strata assigned to the Great Valley Group, shallow marine strata of the Miocene San Pablo Group, and terrestrial strata of the Miocene Contra Costa Group (Wagner et al. 1991). Quaternary alluvial strata accumulated on essentially modern topography buttress against the rangefront, and both active (Holocene) alluvium and older Quaternary terrace deposits are present in the larger stream valleys (Wagner et al. 1991).

Valley Floor

The Santa Clara Valley is filled by as much as 1,950 feet of primarily continental (alluvial) sediment largely accumulated within the last 780,000 years. These deposits are essentially flat-lying (Wentworth et al. 2005).

3.2.4 Soils

Because of the geologic, climatic, and topographic diversity of the Santa Clara Valley and neighboring uplands, the study area's soils are also very diverse, and a large number of individual soil units have been mapped in the study area. These have been organized into 20 soil associations consisting of soil units of the same texture and composition. Following is a general overview of soil characteristics in the Santa Clara Valley and adjacent areas, by geographic position (U.S. Soil Conservation Service 1968, except as noted). **Figure 3-3** shows generalized soil type distribution in the study area.

- **Lowland areas influenced by tidal waters.** These typically fine-textured, saline, clay-rich soils are restricted to the north-central portion of the study area, along the Bay margin and as far south as parts of the Mountain View-Sunnyvale area. Plant associations supported by these soils may be limited by soil salinity and/or moisture content.
- **Level, low-lying valley areas.** Soils of the Santa Clara Valley flatlands are typically very deep, fine- to medium-textured, and poorly to somewhat poorly drained under natural conditions. Plant associations on these soils may be limited by soil texture and/or moisture content.
- **Major valley drainageways and lower alluvial fan surfaces.** Most soils formed on the flat alluvial plains along major valley drainages and on gently

to moderately sloping surfaces on the lower portions of alluvial fans are medium-textured, although some are gravelly. They range from moderately well drained to somewhat excessively drained under natural conditions. These soils are considered very good for cultivation.

- **Older alluvial fans and terraces in valley-margin and foothills.** Soils of the study area's older alluvial fans and terraces are texturally diverse. They are typically moderately drained to well drained but are underlain by subsoils that contain abundant clay and thus drain slowly. Plant associations on these soils may be limited by low fertility and/or low moisture content.
- **Upland soils.** Soils of the study area's mountainous uplands are typically shallow and well drained and have developed on site from local bedrock.

Serpentine Soils

Of particular importance from a conservation perspective are the study area's serpentine soils, which are derived from the serpentinite ultramafic rocks of the region. Serpentine soils are typically very shallow, nutrient-poor (i.e., low levels of nitrogen, potassium, phosphorous, and molybdenum essential for normal plant growth), high in magnesium, and may contain elevated levels of the heavy metals chromium and nickel that are toxic to many plant species (Kruckeberg 1954, 1984). Water availability in serpentine soils may also be limited (Davis et al. 1997). As a result, serpentine soils support limited and highly specialized floras and vegetation associations that often include a high number of endemic (i.e., largely or entirely restricted to serpentine soils) and special-status species (Kruckeberg 1984; Safford et al. 2005).

The occurrence of serpentine soils in Santa Clara County is best predicted by a combination of soil and geology maps. As shown in **Figure 3-4**, the study area supports an estimated 13,180 acres of serpentine soils, 9,194 acres of serpentine bedrock, and 12,636 acres where serpentine soil and bedrock overlap (Brabb and Dibblee 1974; Dibblee 1973, 1977)[4]. As inferred from serpentine soil and geology maps, we estimate a total of 35,010 acres of serpentine soils in the study area. By far the largest occurrence of serpentine in the study area is along the low ridge immediately east of U.S. 101 known as the "Kirby Hills" or "Coyote Ridge" between the Silver Creek Hills and Anderson Reservoir (this document uses the name Coyote Ridge for this feature). Other important outcrops of serpentine soils in the study area occur in or on the following areas:

- the Santa Teresa Hills,
- Communications Hill,
- Tulare Hill,
- the foothills of the Santa Cruz Mountains near Chesbro and Calero Reservoirs,

[4] For the purposes of this Plan, serpentine soils are assumed to occur where serpentine soils and serpentine bedrock are mapped. Each map layer alone is insufficient to fully represent field conditions.

- the foothills adjacent to and west of Anderson Reservoir, and
- the foothills adjacent to and west of Coyote Creek upstream of Anderson Reservoir and Coyote Reservoir.

Serpentine plants occur in small patches outside mapped serpentine soils and geology, possibly due to serpentine alluvial material washing downstream (J. Hillman pers. comm.).

3.2.5 Climate and Hydrology

Climate

Santa Clara County has a Mediterranean climate, characterized by extended periods of precipitation during the winter months and virtually no precipitation from spring through autumn. The wet season generally extends from November through April, while rainfall from May through October tends to be minimal. Annual average rainfall varies significantly due to topography and related orographic and rain shadow effects. Increased elevation on coastal oriented slopes (typically west/southwest facing) results in increased precipitation while descending the lee-side interior facing (typically east/northeast facing) results in decreased precipitation. A rainfall transect across the county illustrates this condition. For example, portions of Santa Clara County in the Santa Cruz Mountains receive 40 to 60 inches per year. Moving east, down the lee side of the Santa Cruz range into the rain shadow of the central Santa Clara Valley, precipitation falls an average of 13 to 14 inches in the vicinity of downtown San José (Santa Clara Basin Watershed Management Initiative 2003); see **Figure 3-5**). Similarly, moving further east and ascending the west facing slopes of the Diablo Range, precipitation increases with elevation to 20–30 inches per year. Further east into the interior valleys and ridgelines of the Diablo Range, precipitation amounts similarly fluctuate with elevation and aspect. In addition to orographic/rain shadow effects, site-specific conditions of elevation and aspect will influence local microclimates and water balance conditions. For example, canyon areas of north facing hillslopes and streams that experience less sunlight and less day-length will have less evaportranspiration, greater ambient soil moisture, and generally more moderate and cooler temperatures due to higher moisture content and greater shade.

The wind patterns in the Santa Clara Valley are influenced greatly by the terrain, resulting in a prevailing flow roughly parallel to the Valley's northwest-southeast axis. A north-northwesterly sea breeze often extends up the Valley during the afternoon and early evening and a light south-southeasterly drainage flow often occurs during the late evening and early morning. In summer a convergence zone is sometimes observed in the southern end of the Santa Clara Valley between Gilroy and Morgan Hill, when air flowing from the Monterey Bay through the Pajaro Gap gets channeled northward into the south end of the Santa Clara Valley and meets with the prevailing north-northwesterlies. Wind speeds are greatest in the spring and summer, and least in the fall and winter. Nighttime and early morning hours have light winds and are frequently calm year round, while summer afternoon and evenings can be breezy. Strong winds are rare, coming only with occasional winter storms.

The average annual rainfall in San José for the period of record of July 1, 1948 to December 31, 2005 was 14.66 inches (Western Regional Climate Center 2006). Average rainfall figures can be somewhat misleading because, in addition to seasonal variation, droughts in California are not uncommon. For example, annual rainfall in San José between 1948 and 2005 ranged from 6.12 inches in 1953 to 32.57 inches in 1983 (Western Regional Climate Center 2006). Snow may occur in the mountains where the headwaters for the watersheds are located but melts quickly and does not provide flow from snowmelt in the late spring to early summer as occurs in the Sierra Nevada Mountains.

The Mediterranean climate also produces fairly mild air temperatures in the valley floor that rarely drop far below freezing. North of San José, the average summer temperatures are rarely higher than 90°F. South of San José both summer and winter extremes are somewhat greater (Santa Clara Basin Watershed Management Initiative 2003).

Watershed Hydrology

The major watersheds within the northern portion of the Plan study area are those of the Coyote Creek and Guadalupe River. Portions of the upper Pajaro River Watershed occur in southern Santa Clara County and the study area (see **Figure 3-6**)[5]. Other major drainages that pass through Santa Clara Valley include the Los Gatos Creek, San Tomas Aquino Creek, Saratoga Creek, Calabazas Creek, Stevens Creek and Permanente Creek, all of which originate in the Santa Cruz Mountains. The lower portion of the Guadalupe River watershed is within the study area (**Figure 3-6**). Very small portions of the Calabazas Creek and San Tomas watersheds within San José are also part of the study area (**Figure 3-6**).

While rainfall is the primary source of surface flows in the County, high groundwater tables contribute to the flows of some local streams. Springs are a clear expression of groundwater intercepting the surface. In some areas, springs are an important contributor to perennial flows in local streams. There are 92 springs in the study area mapped by USGS; of these, seven occur on serpentine soils (**Figure 3-6**) and provide important habitat for Mt. Hamilton thistle, which is found primarily in serpentine seeps.

[5] The Pajaro Watershed in the study area includes the following watershed basins: Pacheco (in part), South Santa Clara Valley (in part), Llagas, Uvas, Pescadero (in part).

Coyote Creek Watershed

The Coyote Creek Watershed is the largest watershed in Santa Clara County (206,000 acres, or approximately 40% of the study area) and is entirely contained within the County and the study area except for the outflow to the Bay. The headwaters originate on the east side of Santa Clara County in the Diablo Range. The watershed is bounded by Coyote Creek to the west and the Diablo Range to the east. Coyote Creek is the longest creek in the County at approximately 63 miles. It originates in the Diablo Range at approximately 3,000 feet and flows southward then northward towards South San Francisco Bay (Santa Clara Valley Water District 2002a). Between its headwaters and Anderson Dam, Coyote Creek and its tributaries flow through mostly steep canyons or narrow valleys. Downstream of Anderson Dam, Coyote Creek flows through the flat Santa Clara Valley on a historically wide alluvial plain.

Coyote Creek originates in the Diablo Range and enters Coyote Valley at its topographic divide with the Llagas Basin to the south. Coyote Creek flows northwesterly through Coyote Valley and Santa Clara Valley before entering San Francisco Bay at Alviso. The major tributaries entering Coyote Creek include Fisher Creek, Upper Silver Creek, Lower Silver Creek, and Upper Penitencia Creek (Santa Clara Valley Water District 2002a). Flow in Coyote Creek below Anderson Dam is perennial, and in the summer is sustained with seepage and releases from Anderson Dam, groundwater, and urban runoff (Santa Clara Valley Water District 2002a). The creek also tends to be dry in dry years on the valley floor between Hellyer Park and Capitol Expressway (J. Smith pers. comm. 2009; J. Abel pers. comm. 2010). Coyote Creek above Anderson and Coyote Reservoirs is intermittent in several reaches. Many of the creeks draining into Coyote Creek are perennial, but the smaller tributaries on the eastern side of the watershed are dry during the summer and fall (Santa Clara Valley Water District 2002a).

Upper Penitencia Creek is kept artificially perennial through releases from the South Bay Aqueduct and the City of San José’s Cherry Flat Reservoir. Arroyo Aguague, a tributary to Upper Penitencia Creek in Alum Rock Park, provides surface flow to the creek even if there are no releases from Cherry Flat Reservoir (J. Smith pers. comm. 2009). Much like the Coyote Creek flow pattern, the perennial flow observed is the result of interim operations applied since the onset of the FAHCE proceedings. Under traditional operations, stream flow terminates at the Maybury diversion. Under interim operations a bypass flow is applied to maintain a hydraulic connection with the lower end of the stream and Coyote Creek. Despite augmented flow, recent summer droughts has resulted dry backs has occurred at Cherry Flat and Arroyo Aguague, upstream of the flow augment put-in point.

Coyote Valley is an extension of the Santa Clara ground-water basin and is commonly referred to as the Coyote Valley ground-water subbasin. The Coyote Narrows divides the Coyote Valley ground-water subbasin from the Santa Clara Valley ground-water basin. Characteristics of the basin and subbasin differ. Groundwater generally moves in a northwesterly direction or down the valley. The groundwater level in Coyote Valley is typically shallow or within 50 feet below the surface. Groundwater recharge is predominately from percolation of flow in Coyote Creek in the first 5 to 10 miles downstream of Anderson Dam. Coyote Creek is quite responsive to winter rains and subsequent stormwater runoff. Further downstream, subsurface flow is forced to the surface as the valley becomes confined at Coyote Narrows and returns to the shallow subsurface as it enters the Santa Clara groundwater basin. At the divide between the Coyote and Llagas watersheds there is some movement of groundwater from the Coyote watershed to the Llagas watershed.

In the Coyote Watershed, the SCVWD operates two reservoirs—Anderson and Coyote—that regulate flow into Coyote Creek. Anderson Reservoir is the largest reservoir in Santa Clara County, with a capacity of 90,373 acre-feet. The Coyote Reservoir has a capacity of 23,244 acre-feet. The small (<500 acre-feet) Cherry Flat Reservoir, operated by the City of San José, partially regulates the flows of Upper Penitencia Creek. Flows in other creeks are largely dependent on groundwater, springs, raw water turnouts, or piped urban runoff.

Percolation ponds have been maintained by the SCVWD throughout the watershed to actively promote aquifer recharge in order to minimize future subsidence and saltwater intrusion. These ponds of water are held over naturally occurring sandy gravel beds (Santa Clara Basin Watershed Management Initiative 2003). The four main groundwater recharge areas in the Coyote Watershed are the Penitencia, Overfelt, Ford Road, and Coyote ponds. The Penitencia percolation ponds receive water from Upper Penitencia Creek and the South Bay Aqueduct (which, in turn, receive water from the Sacramento–San Joaquin Delta). The Overfelt ponds are also near the lower reaches of Upper Penitencia creek. The Ford Road and Coyote ponds receive water from Coyote Creek, Anderson Reservoir, and the Central Valley Project supplied by the San Felipe Division of the Bureau of Reclamation. Between Anderson Reservoir and the Coyote Narrows, flows into Coyote Creek are an in-stream source of recharge to the Coyote Creek groundwater basin (Santa Clara Valley Water District 2002a). Flows from Upper Penitencia Creek also provide in-stream recharge in the basin.

Guadalupe River Watershed

The Guadalupe River Watershed headwaters originate on the west side of Santa Clara County in the Santa Cruz Mountains and encompass approximately 109,000 acres, 59,000 acres of which (54%) are in the study area. The Guadalupe River discharges to the southern terminus of San Francisco Bay via the Alviso Slough near the community of Alviso (Santa Clara Basin Watershed Management Initiative 2003). The lowermost reach by San Francisco Bay and the uppermost watershed are excluded from the study area.

Tributaries to the Guadalupe River include Los Gatos, Ross, and Canoas Creeks. Los Gatos Creek is the largest tributary to the Guadalupe River and joins the river near downtown San José (Santa Clara Basin Watershed Management Initiative 2003). Reservoirs in the Guadalupe River watershed include Almaden, Guadalupe, and Calero Reservoirs. All three reservoirs are relatively small;

Calero Reservoir has a capacity of 9,934 acre-feet, while Guadalupe and Almaden have capacities of 3,415 and 1,586 acre-feet, respectively. Runoff is captured in the reservoirs in the winter months and stored for use in the summer dry months. Water released from the reservoirs and the SCVWD's Almaden Valley pipeline maintains perennial stream habitat downstream on Guadalupe Creek to the Los Capitancillos percolation ponds and Guadalupe River. Lexington and Vasona Reservoirs regulate flows in Los Gatos Creek. Vasona Reservoir is the smallest maintained by SCVWD, at 400 acre-feet. Lexington Reservoir is not included in the Plan study area. Releases are made from Lexington Reservoir during summer for groundwater recharge, and flows are percolated into the groundwater upstream of the confluence with the Guadalupe River (Jones & Stokes 2002).

Nine percolation pond facilities are located in the Guadalupe Watershed. Each of the facilities has multiple ponds. Six of the nine percolation pond facilities are charged from Los Gatos Creek, with the rest charged from the Guadalupe River or Guadalupe Creek (Santa Clara Valley Water District 2002b).

Pajaro River Watershed

The Pajaro River is the largest coastal stream between San Francisco Bay and the Salinas Watershed in Monterey County (RMC 2005). Approximately 11.7 miles of the upper Pajaro River fall within the Plan study area in southern Santa Clara County. The Pajaro River eventually enters the Pacific Ocean at Monterey Bay. Pacheco, Uvas, Llagas, and Pescadero Creeks are the primary tributaries to the Pajaro River in the study area and cover an approximately 230,000 acre region. The creeks in this watershed are the only ones in Santa Clara County that flow southward for their entire length (Santa Clara Valley Water District 2002c). All of the Llagas Watershed (65,365 acre) and all of the Uvas Watershed (55,916 acres) are within the study area. Most of the Pacheco Watershed (100,742 acre) and a small portion of the Santa Cruz Mountains Watershed (i.e., the watershed of Pescadero Creek) are also included in the study area (7,269 acres).

Channels in the Llagas Creek watershed have been modified substantially to convey flood flows. Some channels are natural, while others in the urban areas of Morgan Hill, San Martin, and Gilroy are highly modified and largely unvegetated (U.S. Department of Agriculture 1982). Between U.S. 101 to Santa Theresa Blvd, portions of Uvas Creek have also been modified with levees and armoring to convey flood flows (J. Abel pers. comm. 2010). In addition, extensive quarry operations from to 1940s to 1960s in the Christmas Hill Park area have affected channel morphology of Uvas Creek (J. Abel pers. comm. 2010). Pacheco Creek remain largely unmodified by flood control projects.

There are three reservoirs in the Pajaro Watershed within the study area: Uvas and Chesbro, owned by SCVWD, and the Pacheco Reservoir, owned by the private Pacheco Pass Water District. Uvas Reservoir impounds water along Uvas Creek and has a capacity of 9,835 acre-feet. Chesbro Reservoir occurs along Llagas Creek and has a capacity of 7,945 acre-feet. SCVWD maintains percolation ponds below Chesbro Dam along Llagas Creek (U.S. Department of Agriculture 1982).

Soap Lake is a natural floodplain basin, approximately 9,000 acres in size, on the Pajaro River, divided between Santa Clara and San Benito Counties at the southern edge of the Santa Clara Valley and the northern edge of the Bolsa Valley. During significant rain events, Soap Lake is a floodplain that acts as a retention basin, capturing flows from Pacheco Creek and Tequisquita Slough. The lake discharges primarily to Miller Canal, which discharges to the Pajaro River near the mouth of Llagas Creek; at high flows a portion of the discharge flows to the old upper Pajaro River, which was bypassed by Miller Canal. During moderate floods, Soap Lake may extend just beyond San Felipe Lake in San Benito County. During 100-year events, Soap Lake may expand to several thousand acres, encompassing the lower reaches of Llagas Creek and Uvas Creek (RMC 2005). A recent study has determined that Soap Lake is vital to reduce flooding risk in the lower Pajaro River in Monterey County and within the cities of Castroville and Watsonville (RMC 2005).

Hydrologic Modifications

Due to urbanization and water-supply projects throughout the County, the natural hydrology of many streams and watersheds has been altered. Modification of natural flow patterns is the result of water storage and release from reservoirs and percolation ponds, increased runoff, channel modification, groundwater withdrawal, land subsidence, hydraulic structure placement, vegetation clearing, and urban development. The resulting stream hydrograph reduces peak winter flows and provides additional water during drier summer months. This alteration of the hydrograph is clearly evident in Coyote Creek. **Figure 3-7** shows mean monthly streamflow in Coyote Creek before and after the construction of Anderson Dam. In the winter, Anderson Reservoir captures rainfall and releases winter flows that are reduced and less variable from the historic condition. During the dry season, reservoirs also release water in order to maintain flows during the summer months, increasing flows compared to historic conditions. The net result has been a “flattening” of the hydrograph and reduction in the historic seasonal variations in flows. Increased summer flows and restrictions on channel meandering has also increased the density of riparian vegetation (Grossinger et al. 2006), altering ecosystem function.

Runoff from streams and surrounding areas becomes less attenuated (i.e., flashier) as the density of urban development increases. Replacement of natural vegetation with impermeable urban surfaces such as asphalt, concrete, and roofs; and highly efficient drainage systems increases the volume of runoff and the peak flow rate for frequent events (Santa Clara Valley Water District 2001). The decreased infiltration and increased runoff associated with urbanization can cause the size of peak floods to increase (County of Santa Clara Planning Department 1969).

Flooding due to increased runoff has changed historical stream morphology and flow patterns in the watersheds. While some of the stream channels in the upland areas are still natural, most of the tributaries within the valley floor area of the watershed have been significantly modified to optimize flood conveyance. Many types of channels have been constructed for controlling high flows, including earthen levees, trapezoidal concrete channels, floodwalls and culverts (Jones & Stokes 2000). Design and operation of flood-conveyance elements were historically focused on conveying 100-year storm flows and to accommodate new development adjacent to these stream corridors (Santa Clara Valley Water District 2002a).

Channelization projects designed to increase hydraulic capacity often expanded channel dimensions and straightened channel meanders. The construction of channels to unnatural dimensions leads to increased sediment deposition as the stream attempts to re-create smaller, equilibrium dimensions. For example, the lower reaches of Coyote Creek and the Guadalupe River have been channelized and the streams are now contained between several miles of earthen levees.

Intensive withdrawal of groundwater from the alluvial aquifers in the San José area between the early 1900s and mid-1960s caused a decline in groundwater levels and resulted in substantial land subsidence. For example, 12.7 feet of subsidence was measured in San José from 1916 to 1969 (Poland 1969; Poland and Ireland 1988). Subsidence was one important factor that led to increased flooding in the northern Santa Clara Valley in the twentieth century. Since 1967, recovery of the water table has been substantial because of increases in imported water by SCVWD, the use of percolation ponds and river systems to recharge the aquifer (in part with this imported water), and favorable local-water supply resulting in decreased withdrawal and increased recharge.

Percolation ponds provide holding areas where water slowly recharges groundwater to primarily offset pumping that exceeds the natural recharge. Percolation ponds also compensate for the reduced rates of infiltration from urban development and other impermeable land uses. The SCVWD releases locally conserved and imported water to 71 off-stream percolation ponds that range in size from less than 1 acre to more than 20 acres. Through local streams and percolation ponds, the SCVWD recharges the groundwater basin with about 157,000 acre-feet of water each year (Santa Clara Valley Water District 2002b). Groundwater recharge keeps some streams flowing year round, when under natural conditions, the streams would be dry during the summer into the early fall. Very little published information exists to present a current groundwater budget detailing inflows and outflows for the Santa Clara Valley basin (California Department of Water Resources 2004).

3.3 Ecosystems, Natural Communities, and Land Cover

3.3.1 Definitions

The following definitions are provided to clarify terms used in the NCCP Act. These terms are also found in the glossary (**Appendix A**).

Ecosystem Functions and Services

In order for this Plan to be approved, the NCCP Act requires CDFG to make findings that this Plan conserves, restores, and manages representative natural and seminatural landscapes to maintain the ecological integrity of large habitat blocks, ecosystem function, and biological diversity (California Fish and Game Code Section 2820(a)(4)(A)). For the purposes of this Plan, *ecosystem function* is defined as processes operating at the ecosystem level, such as the cycling of matter, energy, and nutrients that maintain the characteristics and biodiversity of an area (Mooney et al. 1995). Ecosystem functions include such biological and physical processes as hydrological regulation, dispersal, predation, herbivory, pollination, decomposition, nutrient cycling, soil disturbance, and energy fluctuations.

The general ecological concept of ecosystem function as it applies to conservation has evolved in the last two decades to focus on the subset called ecosystem services[6], and a shift in management strategy from protection of reserves to sustainability and stewardship of the human-occupied landscape (Daily and Matson 2008; Cowling et al. 2008). Ecosystem services include maintenance of habitat for endangered species as well as production of clean water and air, aesthetics for tourism, forage for livestock, and climate stabilization. They have human economic value that can generate payments as incentives to maintain those services. This newer concept recognizes the vital roles of people, including planners, managers, and consumers, in a vision of conservation for California rangelands (Daily 2011).

Biological Diversity

The NCCP Act calls for the protection of species diversity on a landscape or ecosystem level through the creation and long-term management of habitat reserves or other measures that provide equivalent conservation of covered species appropriate for land, aquatic, and marine habitats within the area (California Fish and Game Code Section 2820(a)(3)). The NCCP Act also calls

[6] Jack et al (2008) defines ecosystem services as the benefits that people derive from ecosystems, including commodities and regulating, supporting, and cultural services.

for maintaining biological diversity through conservation, restoration, and management of natural and seminatural landscapes.

Biological diversity or *biodiversity* is defined in this Plan as the variety of organisms considered at all levels, from genetic variants of a single species through arrays of species to arrays of genera, families, and higher taxonomic levels (Lincoln et al. 1998).

Ecological Integrity

The NCCP Act calls for sustaining the effective movement and interchange of organisms between habitat areas in a manner that maintains the ecological integrity of the habitat areas within the study area (California Fish and Game Code Section 2820(a)(4)(E)). The NCCP Act also calls for maintaining the ecological integrity of large habitat blocks through conservation, restoration, and management of natural and seminatural landscapes.

Ecosystems have *ecological integrity* when their native components are intact, including abiotic components, biodiversity, and ecosystem processes. This Plan seeks to support the goal of ecological integrity by protecting large blocks of habitat such that the various components of functioning ecosystems are maintained in an interconnected area.

Environmental Gradients

The NCCP Act calls for incorporating a range of environmental gradients such as slope, elevation, aspect, and coastal or inland characteristics to provide for shifting species distributions due to changed circumstances (California Fish and Game Code Section 2820(a)(4)(D)).

This Plan defines *environmental gradient* as a shift in physical and ecological parameters across a landscape, such as changes in topography, climate, geology, land cover types, and natural communities.

Natural Communities

Natural communities are a collection of species that co-occur in the same habitat or area and interact through trophic and spatial relationships. Communities are typically characterized by reference to one or more dominant species (Lincoln et al. 1998). The NCCP Act calls for the protection of natural communities on a landscape or ecosystem level through the creation and long-term management of habitat reserves or other measures that provide equivalent conservation of covered species appropriate for land, aquatic, and marine habitats within the area (California Fish and Game Code Section 2820(a)(3)). In the Santa Clara Valley Habitat Plan study area, seven natural communities and two additional land cover types (irrigated agriculture and developed) are defined that will be discussed further in the chapter.

The term *rangeland* is used in this Plan to refer to the collection of multiple natural communities on which the indigenous vegetation is predominantly grasses, grass-like plants, forbs or shrubs that are grazed or have the potential to be grazed, and which is used as a natural ecosystem for the production of grazing livestock and wildlife. Rangelands include natural grasslands, savannas, shrublands, many deserts, steppes, tundras, alpine communities and marshes (Allen et al. 2011). Rangelands usually occur in areas not suitable for cultivation, irrigation, residential development, industrial development, or timber production. The rangelands within the study area occur primarily in grassland land-cover types but also include oak woodlands, riparian forest, and seasonal wetlands. Rangelands in the study area are considered “working rangelands” because numerous economic activities (including livestock grazing) take place there.

3.3.2 Methods

Data Collection

Sources used to map and describe the physical setting of the study area are listed below.

- U.S. Geological Survey data on topography and hydrology.
- Geologic maps of the area (Wagner et al. 1991; Helley et al. 1994).
- Geologic map, Santa Clara County, California. California Division of Mines and Geology, scale 1:62,500 (Brabb and Dibblee 1974).
- Preliminary map of Santa Clara Valley serpentines [soils] (unpublished), scale 1:50,000 (Dibblee 1973, 1977).
- Preliminary geologic map of the Mt. Madonna quadrangle, Santa Clara and Santa Cruz Counties, California. U.S. Geological Survey Open-File Report [OF-73-59], scale 1:24,000 (Dibblee 1973).
- Soil survey information (U.S. Soil Conservation Service 1968).
- Other published information (Hickman 1993; Alt and Hyndman 2000; Santa Clara Valley Water District 2006).
- Springs and rainfall data from USGS (California Spatial Information Library 1997).
- Watershed data from California Interagency Watershed Map (CalWater version 2.2.1) (California Interagency Watershed Mapping Committee 1999).

Topography, hydrology, and soil data were downloaded from agency websites and imported into ArcInfo, where files were clipped and converted into the projection for the study area.

Land Cover Mapping

One of the primary data sources for this Plan is a detailed geographic information systems (GIS)-based map of land cover types within the study area. A *land cover type* is defined as the dominant character of the land surface discernible from aerial photographs, as determined by vegetation, water, or human uses. Land cover types are the most widely used units in analyzing ecosystem function, habitat diversity, natural communities, wetlands and streams, and covered species habitat. Data sources, mapping standards, and the classification and interpretation of land cover types are discussed below.

Data Sources

The following are the primary sources of information for the land cover mapping in the study area.

- True-color aerial photographs (resolution of 2 feet[7]) flown in December 2003 (acquired from AirPhoto USA).
- True-color aerial photographs for non-urban portion of the study area (resolution of 9 inches) flown in March 2001 (provided by Santa Clara Water District).
- Serpentine soils and serpentine geology digitized from the map sources listed above.

The ancillary data sources listed below were used to obtain information not available in the primary sources and to check the mapped information for accuracy.

- True-color aerial photographs (resolution 1.5 foot) flown in December 2005 (acquired from AirPhoto USA)[8].
- National Wetlands Inventory Maps (scale 1:65,000) from the U.S. Fish and Wildlife Service for a portion of the study area based on color-infrared photographs taken in 1982–1987.
- Streams (Produced by SCVWD in 2006–2007; see discussion below).
- Local roads (Santa Clara County data set).
- Coyote Valley Specific Plan vegetation data developed from site visits (City of San José 2004).
- Soil survey mapping (U.S. Soil Conservation Service 1968).
- Historical locations of valley oak; GIS layer digitized from the 1:62,500 Wieslander Vegetation Type Map, a dataset of photos, species inventories, and plot maps compiled in the 1920s and 1930s (California Department of Forestry and Fire Protection 1992).

[7] Each cell represents an area on the ground of approximately 2 feet by 2 feet, or 4 square feet.
[8] December 2005 air photos were not made available until March 2006. These photos could not be used as the primary air photo source because the land-cover mapping process started in November 2005.

- Vegetation maps of open space preserves adjacent to the western portion of the study area developed from air photo interpretation (Midpeninsula Regional Open Space District 2006).
- Vegetation map of the Coyote Creek Parkway County Park developed from remote sensing (County of Santa Clara Parks and Recreation Department 2004a).
- Land cover map for the San Francisco Public Utilities Commission's Alameda Watershed lands in Santa Clara and Alameda Counties (adjacent to the northern edge of the study area) developed from air photo interpretation (Jones & Stokes 2005).
- Current land cover maps for large projects in the study area:
    - The Castro Valley Ranch EIR, an approximately 8,500-acre site in the southwest corner of the study area, developed from site visits (H.T. Harvey & Associates 2006).
    - Mapping of freshwater and seasonal wetlands in Coyote Valley (City of San José 2007).
    - Land cover mapping of the proposed Lucky-Day Wildlife Conservation and Wetland Mitigation Bank (WRA Environmental Consultants 2008), north of Gilroy.
    - Land cover and habitat mapping for Young Ranch on Coyote Ridge (WRA Environmental Consultants 2012).
- Historical tideline data from Coyote Creek Historic Ecology Report (Grossinger et al. 2006) and historical land cover data from the study area (Grossinger et al. 2006; San Francisco Estuary Institute 2008).

In addition to using existing data sets, ICF biologists conducted field visits in accessible portions of the study area to develop and verify land cover mapping. An initial field visit was conducted on December 15, 2005 to develop the land cover classification and to perform preliminary verification of aerial photograph signatures. Other field visits were conducted on April 20–21, May 3–5, May 11–12, and May 24–25, 2006 to verify land cover types and consistency of mapping, and to collect additional data for land cover type descriptions. Initial mapping was verified by visual inspection from locations accessible by public roads and roads on state-owned and private lands for which access permission had been obtained. Areas were selected for field verification on the basis of the land cover types present and accessibility.

Access was difficult in many parts of the study area due to extensive private lands and few public roads. Access in the western portion of the study area was sufficient to verify the different land cover types that occurred there. Access in the central eastern portion of the study area was more limited, but also allowed most land cover types to be visited. Access to the extreme northeast, east, and area south of SR 152 was not possible due to extensive private holdings and lack of approvals for access. There were no unique land cover types in these areas so we believe that this lack of access did not compromise the land cover mapping.

Once field visits were conducted, land cover mapping was revised on the basis of field findings.

Land Cover Type Classification

A classification system for land cover types was developed for the study area based primarily on the widely used classification system of the CDFG (California Department of Fish and Game 2003a, 2007), which in turn is based on the vegetation classification system developed for the Manual of California Vegetation (Sawyer and Keeler-Wolf 1995). Additional input was obtained from the sources listed below.

- Holland (1986) and Mayer and Laudenslayer (1988, 1999).
- Current regional and local mapping projects such as Coyote Ridge (California Native Plant Society 2003), Sierra Azul Open Space Preserve (Midpeninsula Regional Open Space District 2006), and the land cover map for the San Francisco Public Utilities Commission's Alameda Watershed lands in Santa Clara and Alameda Counties, adjacent to the study area (Jones & Stokes 2005).
- Field visits by ICF senior biologists.

The proposed system (**Table 3-1**) has been adapted to incorporate classification systems used by the Local Partners with input from vegetation and wildlife specialists familiar with the study area. The land cover classification was developed with the criteria listed below.

- Each land cover type must be distinguishable on the digital aerial photography based on a unique and consistent signature, or with the use of ancillary data such as soil types or geologic substrate.
- Each land cover type should be useful to the Plan in terms of defining the location and extent of an important vegetation type, habitat for covered species, or a distinct type of development.
- The land cover type classification should be compatible with existing local, regional, and national land cover classification schemes when possible.

A list of land cover types is given in **Table 3-1**. A comparison ("cross-walk") between land cover types and common vegetation classification systems is presented in **Table 3-2**.

Mapping Procedures

ArcGIS 9.0 software was used to create a GIS dataset of land cover types. The land cover classification also defined the minimum mapping unit that was used for each land cover type. *Minimum mapping units* are the smallest area mapped for each type. Minimum mapping units range from 0.25 acre for wetland and riparian land cover types to 10 acres for most other land cover types. This range of minimum mapping units is sufficient for regional conservation planning and balances the need for high resolution (lower minimum mapping unit) with schedule and budget limitations (higher minimum mapping unit). Minimum mapping units are also limited by the resolution of the imagery and the distinctiveness of the land cover signature relative to adjacent land cover.

A 10-acre minimum mapping unit was used for all land cover types, except for the land cover types noted below.

- Serpentine bunchgrass grassland and mixed serpentine chaparral, which were mapped at a 1-acre minimum mapping unit.
- All riparian, wetland, and aquatic types, which were mapped at a 0.25-acre minimum mapping unit.
- Serpentine seeps and rock outcrops, which had no minimum mapping unit (but due to air photo resolution had a likely minimum mapping unit of 0.1–0.25 acres).

The mapping process involved digitizing polygons on screen (a process known as "*head-up digitizing*") from the primary aerial photographs described above, followed by field verification and a formal accuracy assessment.

Polygons were digitized for areas with distinct image signatures that met minimum mapping unit requirements. Digitizing was completed on-screen by botanists familiar with the study area, and well trained and experienced with this mapping procedure from other HCPs and NCCPs in northern California. Digitizing was conducted while viewing the aerial imagery at mapping scales of 1:4,800 to 1:6,000. The botanists were provided with grids of 0.25 acre and 10 acres to assist in maintaining the minimum mapping units during digitization. Once digitized, polygons were assigned to land cover types on the basis of the criteria in the land cover type definitions (described below under each land cover type).

During the mapping process, polygons with uncertain land cover types were flagged for future field verification. Once the mapping was complete, the botanists verified these ambiguous polygons in the field where access was available.

Serpentine bunchgrass grassland and serpentine chaparral were mapped based on the intersection of annual grassland and chaparral, respectively, with the serpentine soils and geology layers (**Figure 3-4**), and verified in the field where possible. Some areas along Coyote Ridge that were mapped as having serpentine soils or geology were excluded from the serpentine bunchgrass grassland or serpentine chaparral land cover layers because of a lack of field evidence of these plant communities (S. Weiss pers. comm.). Serpentine bunchgrass grassland mapping was refined based on site specific mapping when available (e.g., WRA Environmental Consultants 2009). Boundaries of aquatic features (ponds, reservoirs) were digitized based on the March 2001 photograph when water levels were higher than in the December 2003 image. Recent urban and agricultural development was updated based on the December 2005 aerial photography.

Ancillary information was used to supplement the land cover information acquired by aerial photograph interpretation. National Wetlands Inventory maps were used to check and augment the wetlands mapping, especially for isolated ponds and seasonal wetlands. Data from SCVWD were used as the stream layer for the area. In 2006–2007, SCVWD staff digitized all stream reaches in the study area using USGS Digitial Elevation Models (DEM) overlaying color orthophotos. Mapped signatures for specific land cover types were also compared with vegetation maps of the Sierra Azul Open Space Preserve (Midpeninsula Regional Open Space District 2006) to verify the accuracy of the current mapping effort.

Accuracy Assessment

A formal accuracy assessment could not be conducted for all land cover types due to the inaccessibility of large areas of the study area. However, a field accuracy assessment was performed for all land cover types on the Santa Clara Valley floor to quantify the reliability of the mapping. For land cover types with fewer than 30 polygons, all accessible polygons were field verified. For land cover types with more than 30 polygons, a random sample of 30–40 polygons was selected and verified if accessible. A total of 306 polygons were field verified during this accuracy assessment. Field verification was conducted by two staff, including one botanist. Field verification was performed by visual observation of land cover units from publicly-accessible roads using binoculars and views from vantage points where possible.

A polygon was classified in one of three ways. The first classification was "no change", meaning the polygon was mapped correctly. The second classification was "error", indicating a misinterpretation from the aerial imagery. The third classification was "change," indicating a land use change that occurred after the aerial photographs were taken. The resulting map accuracy for the Valley floor was 73% when calculated by number of polygons. The map accuracy for the Valley floor was 89% when calculated by polygon area (31,258 acres were checked)[9]. All errors identified were corrected in the final land cover map.

Table 3-3a indicates the results of the accuracy assessment of the land cover mapping in the Valley floor by polygon. **Table 3-3b** provides the same results by acreage of land cover type.

Land cover types outside the Valley floor were spot checked throughout the rest of study area in a series of field visits from public roads. Based on the accuracy assessment and these site visits, a qualitative estimate of overall confidence in the mapping of all land cover types is presented in **Table 3-4**. Factors that were considered in this subjective estimate included:

[9] The error rate for urban and agricultural land-cover types may not be a good indication of the error rate for natural land-cover types due to the substantial differences in polygon size, complexity, and patterns of air photo signatures.

- the quantitative results of the accuracy assessment,
- the ability of field crews to visit a representative sample of polygons and verify land cover signatures and mapping units, and
- the distinctiveness of the air photo signature during the season of the photo flight.

Fish Habitat Assemblage Data

A map was developed of native and nonnative fish assemblages and aquatic habitat types throughout the major stream systems in the study area to characterize these important stream communities. Data was first developed to support SCVWD's Stream Maintenance Program. Dr. Jerry Smith of San José State University updated the map in July 2006 for the Science Advisors report of the Habitat Plan to reflect barrier removal and sampling results that occurred in the intervening years since the original map was created (Spencer et al. 2006). The map was then further revised and updated in 2007 by Dr. Smith and Jae Abel, a senior fisheries biologist at SCVWD. Jae Abel then adapted the map so that it corresponded to the new GIS stream data layer developed for the study area by SCVWD in early 2007. Ten categories were defined of fish assemblages and aquatic habitat types. These habitat categories and the fish assemblage map are described in **Appendix L**. The data presented in the appendix are to support the descriptions of natural communities in the study area. These data will not be updated as part of Plan implementation.

3.3.3 Covered Species

Ecology and Distribution

Detailed *species accounts* of each of the 19 covered species (**Table 1-2**) are provided in **Appendix D**. These accounts summarize ecological information, distribution, status, threats, population trends, and conservation and management activities in the study area. The accounts represent the best available scientific data for each species on which to base this Plan. The species accounts are not intended to summarize all biological information known about a species. Rather, each account summarizes scientific information that is relevant to this Plan. Each account is designed for easy reference; all literature cited within the account is provided within it. The biological data in these accounts form the basis for the impact analysis (Chapter 4) and conservation strategy (Chapter 5) in this Plan.

Land cover types are the basic unit of evaluation for habitat modeling, analyzing potential impacts, and developing conservation strategies for covered species. Most covered species are associated with one or more land cover types (**Table 3-5** for wildlife, **Table 3-6** for plants). These land cover type associations, plus other habitat features, were used to develop habitat distribution models for 15 of the 18 covered species that provide additional information on species impacts and conservation needs.

Habitat Distribution Models

Habitat distribution models were developed for select covered species to predict where within the study area covered species occur or could occur based on known habitat requirements. These models have been used to assist in quantifying impacts of covered activities on covered species and to assist in developing the conservation strategy[10]. Alternative reserve and restoration designs were evaluated against each covered species model, when available, to help ensure that regulatory standards and biological goals for these species will be met and that conservation for each species is maximized. Habitat distribution models for 15 of the covered species are described in detail in the respective species account (**Appendix D**). Methods used for all models are described below.

Because of model limitations (see *Model Limitations* discussion below), models could not be developed for three of the 18 covered species. For some species, the number of known occurrences within the study area was so low that habitat potential could not be modeled with confidence (e.g., Tiburon Indian paintbrush). Some plant species have very specialized habitat requirements that could not be modeled given the available data (e.g., coyote ceanothus, Santa Clara Valley dudleya). For species without models, development of the conservation strategy ultimately took a more conservative approach than for species with models. For example, field surveys were required more often in suitable habitat for species without models than for species with models. Information in the species accounts was adequate to develop the impact analysis and conservation measures for the species without habitat models.

The habitat map for Bay checkerspot butterfly, a covered species, was developed based on extensive field surveys. This map is described in more detail in the species account and should be considered as a habitat map rather than a predicted habitat distribution.

Model Structure and Development Methodology

The 15 habitat models described in the species accounts were designed to estimate the extent and location of key habitat characteristics of each species and to be repeatable and scientifically defensible, while remaining as simple as possible. The models are spatially-explicit, GIS-based “expert opinion models” based on identification of land cover types that provide important habitat for these species (**Table 3-5**). Land cover types were identified as suitable habitat based on the known or presumed habitat requirements and use patterns of each species. When supported by appropriate data, the models also incorporate physical parameters including

[10] Habitat distribution models have been developed on a regional scale using regional data. The models are intended for use in regional planning and do not necessarily provide accurate site-specific species information. For project planning, model results must always be field-verified.

- elevation limits using an absolute limit when data supported a clear limit, or one or more of seven elevation categories (0–500, 500–1000, 1001–1500, 1501–2000, 2001–2500, 2501–3000, 3001–3500 feet msl) when data were insufficient to determine an absolute limit,
- soil type based on eight broad categories (clay, loam, silt, sand, coarse sand, rock, other, unknown [U.S. Soil Conservation Service 1968]),
- presence or absence of serpentine soils and/or serpentine geology (Dibblee 1973, 1977; Brabb and Dibblee 1974)
- slope steepness based on three categories (flat 0–10%, moderate 11–25%, steep >25%), and
- ecoregion subsection (U.S. Forest Service 1997; see **Figure 3-8**).

Further, in some cases, perimeter zones that were used to designate habitat are defined by a certain distance from a land cover type. For example, the California red-legged frog model uses upland habitat for aestivation (summer hibernation) and dispersal, but the probability of use decreases with increasing distance from suitable breeding sites (e.g., ponds, streams).

Primary and secondary habitats for wildlife were designated according to type of habitat use. Land cover types used for breeding were designated as primary habitat. Secondary habitat includes other important habitats used for foraging, aestivation, migration, movement, or dispersal. This secondary habitat is no less important for the species than primary habitat but merely characterizes different habitat function for the species.

Determinations of suitable land cover types and additional physical parameters were based on available data from peer-reviewed scientific literature, survey reports, and environmental documents. Local survey data were used whenever possible to define model parameters. When data were inconclusive or contradictory, conservative values were assumed in estimating suitable habitat. See below for a discussion of the model limitations.

Covered Species Locations

Documented occurrences of covered species within the study area were used to validate and refine the models. Sources of occurrence data are listed below.

- California Natural Diversity Database (2008 and 2012 data).
- Plant occurrence records from 2004 SCVWD surveys of their facilities (J. Hillman pers. comm.).
- A 1999 survey of foothill yellow-legged frog in Santa Clara County (H.T. Harvey & Associates 1999).
- Least Bell’s vireo survey data from SCVWD (Santa Clara Valley Water District 2002d, 2003, 2004).

- Rare plant and special-status wildlife survey data from field work conducted in 2005-2006 east of San José on an approximately 8,000-acre property owned by United Technologies Corporation (UTC) (T. Marker pers. comm.).
- Recent plant occurrence records from the California Native Plant Society (K. Bryant pers. comm., 2006–2007 data).
- Bay checkerspot butterfly survey data from field work conducted between 2009 and 2011 on the 2,150-acre Young Ranch site (WRA Environmental Consultants 2012).

Occurrences that fell outside a model's predicted habitat distribution were evaluated to determine whether they indicated flaws in the model or were anomalous or erroneous points. Erroneous points were deleted; anomalous points were retained but were not used to verify model results. The aerial photographs were examined to assess the significance of extreme outliers.

The majority of the records come from the CNDDB (California Natural Diversity Database 2008, 2012). Occurrences that have been documented since 1980 were assumed to be extant unless they were on sites that have obviously been converted to other land uses. These recent occurrences were used to verify habitat models. These occurrences are displayed as either *precise locations* or *general locations*, described in more detail in *Occurrence Data Precision* below. Any occurrence before 1980 is considered a *historical location*[11] and is not shown on the habitat model, with a few exceptions. Historical occurrences were considered if the land use at the location has clearly not changed since the sighting (e.g., a state park). Historical occurrences presumed extant were also used to supplement models with few recent occurrence records.

CNDDB Data Limitations

CNDDB records represent the best available statewide data but are limited in their use for conservation planning. CNDDB records rely on field biologists to voluntarily submit information on the results of surveys and monitoring. As a result, the database is biased geographically toward areas where surveys have been conducted or survey efforts are greater (many areas have not been surveyed at all and this is not reflected in the database). The database may also be biased toward species that receive more survey effort. For example, there have been more surveys for California red-legged frog than other special-status wildlife because it is a listed species. Conspicuous diurnal species such as raptors likely receive greater survey effort than nocturnal species such as bats. Plants typically receive less survey effort than wildlife.

[11] The year 1980 was selected as a somewhat arbitrary cutoff date. We assume that before this year occurrence records are more likely to be inaccurate or no longer present than occurrence records after this year. 1980 is also the cutoff date used by The Nature Conservancy in their internal ecoregional planning process in California.

Occurrence Data Precision

Data that are reported to the CNDDB are done so with varied precision. Some occurrences are very well documented with explicit locations (e.g., GPS coordinates) while others are reported with more general location information. CNDDB staff qualitatively categorize each occurrence record into one of two categories: *specific* and *non-specific* (California Natural Diversity Database 2008).

A *specific* occurrence has sufficient information to be located on a standard USGS 7.5-minute quadrangle map. This information may be based on political or natural features but has been very well described by the observer. These occurrences are mapped by CNDDB as points with an 80-meter radius or as specific polygons when information allows. For the purposes of this Plan these occurrences are mapped as points and are labeled as *precise location* on the habitat distribution models.

A *non-specific* occurrence is a species occurrence that has been documented by the observer in very general terms. Sometimes the precise location is unclear or lacks critical information that does not allow it to be mapped accurately. These occurrences are mapped by CNDDB as circular features with a radius of 0.1, 0.2, 0.4, 0.6, 0.8, or 1.0 mile. These occurrences can also be mapped with non-specific polygons, such as the boundary of a park where an occurrence is known to occur. For the purposes of this Plan these occurrences are mapped as points and are labeled as *general location* on the habitat distribution models.

Model Uses and Limitations

The habitat distribution models are intended to be used only for planning purposes at the scale of the study area. The precision of the habitat distribution models is limited by several factors, including the 10-acre/0.25-acre minimum mapping units used to map each land cover type. Areas of suitable habitat smaller than the mapping thresholds were not mapped and could therefore not be incorporated into the models. This constraint limited the degree of resolution of some habitat features potentially important to some species. Therefore, these models should only be used at the regional scale (i.e., scale of the study area) rather than for site-specific planning. In addition, these models are not intended to be used for project-level CEQA analysis, including determinations on the level of CEQA compliance required (e.g., whether a Categorical Exemption is warranted).

The habitat distribution models were limited to distinguishing habitat uses based on key life history requirements such as breeding, foraging, or dispersal that are tied to land cover types. The data do not allow for further distinctions of habitat quality on a regional scale. To account for these limitations, conservative estimates of habitat parameters were used. This approach tends to overestimate the actual extent of suitable or required habitat for this species, but is consistent with current conservation planning practices when data are limited (Noss et al. 1997).

For the most part, the models are used in this plan to denote suitable habitat. Suitable habitat was assumed to be occupied for the purposes of the take analysis and conservation strategy. This approach is justified because of the limitations in occurrence data described above and the infeasibility of determining presence or absence on such a large scale. To conclusively determine absence, the Wildlife Agencies typically require extensive protocol-level surveys in the field, sometimes spanning several years.

Alternative Approaches to Habitat Modeling

In developing the habitat distribution models, we considered other potential approaches. For example, the Science Advisors recommended that statistical modeling techniques be considered for determining species habitat relationships within the study area. Because the study area does not include any data on locations where species are absent, statistical modeling would have to be done with “presence-only models” (Hirzel et al. 2002; Hirzel and Arlettaz 2003; Guisan and Thuiller 2005; Elith et al. 2006; Guisan et al. 2006; Pearce and Boyce 2006). Presence-only models use species presence data to draw inferences about a species’ habitat preference. These models characterize the locations where the species were sighted, calculate habitat scores from those locations, and then compare them to habitat distributions within the entire area of interest. To eliminate the need for absence data, these models either assume that locations without sightings are “pseudo-absences” or that there is something different between sighting locations and all the other locations in the area of interest. After reviewing the data requirements and limitations of these models, we determined that it is not feasible to use them in this HCP/NCCP for the reasons outlined below.

The primary reason we were unable to use these techniques is a lack of available data for the covered species, particularly for species whose habitat requirements in the study area are poorly known and where this technique would be most helpful. For example, the specific habitat needs of San Joaquin kit fox are poorly known in the study area but there are only two observations of this species in the County. Presence-only models typically require at least 50 observations to produce robust results. The only covered species with 50 or more observations in the study area are the California red-legged frog, California tiger salamander, Western burrowing owl, and Western pond turtle. These species have relatively well-understood habitat/occurrence relationships, where an expert opinion model tends to work well. The remaining covered species have approximately 30 or fewer observations in the study, making them inappropriate for presence-only models. We investigated the use of museum records to supplement our occurrence data, but most of the online catalogs did not have recent records for our target species or collectors did not record enough information on habitat associations on the collection records to be useful for a presence-only model. Additional field data collection was also not feasible because of the large scale of the study area and schedule and budget limitations.

We also chose not to use presence only techniques because they are sensitive to the selection of the proper spatial extent and model cell size. The spatial extent of the model should represent the area sampled (Hirzel et al. 2002; Pearce and Boyce 2006). Because CNDDB and our other biological occurrence data do not provide information of the area surveyed it would be difficult to define the spatial limits of the model. Without this information the model results would be biased and may give more of an indication of sampling effort rather than actual habitat value (Pearce and Boyce 2006)[12]. For example, if most of the surveys were conducted along roadsides than the spatial extent of the model should only include habitats near roadsides. As a result, the available biological occurrences do not provide enough information to adequately assess what would be an appropriate spatial extent of the model.

These techniques are also sensitive to the type and number of pseudo-absence sites chosen for the analysis (Pearce and Boyce 2006; A. Gelfand pers. comm.). Because presence-only models sample the presence and pseudo-absence locations in different manners the proportion of presence within the sample does not represent the true prevalence of the species. Therefore, presence-only models with differing number of pseudo-absence sites can come up with dramatically different answers (A. Gelfand pers. comm.).

Finally, presence-only models do not propose a model to be estimated and therefore there is no likelihood function that can be used for statistical inference. Instead, presence-only models primarily fit surfaces or use mathematical values to describe a species relationship among a set of candidate sites. Without a defined likelihood function it is not possible to calculate confidence limits, probabilities of significance, or other values that allows the researcher understand the validity of the resulting model (Gelfand et al. 2006).

Instead of using the presence only modeling techniques we have chosen to use expert opinion models provided by species experts. There are several advantages to using these models in the HCP/NCCP planning process. The first benefit is that experts are identifying habitat as inherently good, not good relative to other sites in the area. This means that good sites have a relatively high probability of species occurrence. Second, research has shown that expert opinion models may overestimate suitable habitat (Johnson and Gillingham 2004). It is desirable to overestimate habitat for this plan because it allows for conservative estimates of impact (i.e., err on the side of overestimating impacts) and conservation of suitable areas. Finally, another important advantage of expert opinion models is that the variables and methods used to construct the models are easily understood and are reproducible by knowledgeable GIS practitioners. Application of presence-only statistical models requires specialized software and uses highly specialized statistical techniques.

[12] A recent application of this type of model using BIOMAPPER for the East San Diego County HCP/NCCP had over 1,700 data points for peninsular bighorn sheep. The model was highly labor-intensive and was very sensitive to subjective assignments of break points for the correlation classifications. In the end, the model produced results that were only somewhat useful for the HCP/NCCP (S. Fleury pers. comm.).

3.3.4 Biological Diversity of Study Area

Species richness, a measure of the number of species in a defined region, is the most readily available measure of diversity and is generally accepted as an index of biological wealth of a region. The number of species that are endemic or unique to a geographic region can provide a measure of biological distinctiveness that is recognized as another measure of biological wealth. When NatureServe examined the diversity and endemism of species for all 50 states in the U.S., California ranked first in both categories (Stein 2002). A unique combination of climate, geography, and topography make California one of the most biologically diverse areas in the world. California is home to several of the nation's biological "hotspots" and has been identified as one of 25 "hotspots" of biodiversity worldwide (Stein et al. 2000).

With a geography that is bordered by the Pacific Ocean, includes San Francisco Bay, and expands eastward into the Sacramento and San Joaquin Valleys, the San Francisco Bay Area is one of only six global hotspots of species rarity in the United States (California Department of Fish and Game 2003b). The nine counties that comprise the Bay Area account for just over 18,000 square kilometers (km^2), or nearly 5% of the state. Within that 5%, 64 of the 194 natural communities mapped by the California Gap Analysis occur (Wild 2002). This accounts for 33% of the natural communities in California.

More than a dozen major rivers flow into the Central Valley from the Sierra, Cascade, Klamath, and Coast Ranges and converge at the San Francisco Bay Delta; a vast network of wetlands that ultimately empties into Suisun Bay (California Department of Fish and Game 2003b). From the south several more rivers and creeks flow directly into San Francisco Bay, and the Bay itself is lined with tidal wetlands and marshes. These aquatic resources alone support over 200 species of birds, mammals, reptiles, and amphibians (California Department of Fish and Game 2003b). This interface with the San Francisco Bay, coupled with an assortment of upland habitat types with exceptional soil diversity and topography, makes the Bay Area a critical element in the biodiversity of California and of the world.

Situated on the south side of the Bay Area, Santa Clara County represents the extremes of the region. Due to the variation in topography and soil diversity within the County there are a wide array of natural community types and subsequently very diverse flora and fauna. The Santa Clara Basin Watershed Management Initiative (2003) reports that there are 93 identified special-status species in the Santa Clara Basin; 24 of which are either federal or state listed as threatened or endangered. The analysis conducted for this Plan identified 147 special-status species that occur or have the potential to occur in the Plan study area. Biological diversity is realized for all species groups and they are discussed in more detail below.

Mammals

Like many southwestern states California has a high diversity of mammals due to its large size and unique environments. In fact, California has the most diverse mammal population of any state and has the most endemic mammal species, with 17 (Stein 2002; California Department of Fish and Game 2003b). The south San Francisco Bay region ranks as medium to high in mammalian species rarity and richness within the state (California Department of Fish and Game 2003b). This is largely driven by the salt marshes in the Bay/Delta region and the riparian habitats that drain to them. Of the 195 known mammalian species within the state (Stein 2002) over 20% can be found within Santa Clara County. Between 40 and 47 of those species can be found in Santa Clara Valley and between 48 and 55 can be found in the surrounding Santa Cruz Mountains and Diablo Range (California Department of Fish and Game 2003b). This represents a range between 20% and 28% of the known mammalian species of the state, respectively, for the major geographic features of the Plan study area.

Birds

California supports one of the most diverse bird populations in the United States. In 2008 the list of birds that spend some part of the year in California was 636 species (California Bird Records Committee 2008).These species range from those who are endemic to California to those that are migratory species that spend part of the year in the state. The south San Francisco Bay region ranks as medium to high in bird species rarity and richness within the state (California Department of Fish and Game 2003b). This is largely driven by the salt marshes in the Bay/Delta region, which are particularly important to many migratory species and the riparian habitats and diverse upland habitats that make up the interior Bay Area. Of the 636 known bird species that either breed in or migrate through the state more than 45% can be found within Santa Clara County. An example of the bird diversity of the study area is provided by the list of 389 species that appear on the Checklist for Birds of Santa Clara County (South Bay Birders Unlimited 2007), 177 of which have been documented breeding in the county (Bousman 2005). Henry W. Coe State Park, the largest open space unit in the study area, supports 162 species of birds that have been confirmed in the park (Pine Ridge Association 2006a).

Reptiles

California ranks fifth overall in reptile diversity by state in the United States with 86 known species (Stein 2002). The south San Francisco Bay region ranks as low to medium in reptilian species rarity within the state and medium to high in species richness (California Department of Fish and Game 2003b). The distribution of reptilian species within the study area is varied. The Santa Clara Valley supports under 10% of the known reptilian species within the state, while the Santa Cruz Mountains and the Diablo Range support up to 30% (California Department of Fish and Game 2003b). An example of the reptile diversity of the study area is provided by the list of 27 reptile species found in Henry W. Coe State Park (Pine Ridge Association 2006b).

Amphibians

California ranks ninth overall in amphibian diversity in the United States with 57 known species (Stein 2002). The south San Francisco Bay region ranks low in amphibian species rarity within the state but medium to high in species richness (California Department of Fish and Game 2003b). The distribution of amphibian species within the study area is varied. The Santa Clara Valley supports less than 10% of the known amphibian species within the state, while the Diablo Range supports 15% and the Santa Cruz Mountains support up to 30% (California Department of Fish and Game 2003b). An example of the amphibian diversity of the study area is provided by the list of 11 amphibian species found in Henry W. Coe State Park (Pine Ridge Association 2006b).

Freshwater Fish

California ranks 34th overall in freshwater fish diversity by state in the United States with 62 known species (Stein 2002). The south San Francisco Bay region ranks low in fish species rarity within the state but medium to high in species richness (California Department of Fish and Game 2003b). The rivers and creeks that drain the Santa Cruz Mountains and the Diablo Range are home to 11 native and 19 nonnative species of fish (Santa Clara Basin Watershed Management Initiative 2003). This represents around 17% of the known freshwater fish species of the state. The most species rich is Coyote Creek with 10 native species followed by the Guadalupe River with seven (Santa Clara Basin Watershed Management Initiative 2003). In the south county, 11 native fish species are found within the Pajaro River watershed, although one of those species, the speckled dace, only occurs in the upper San Benito River, outside of the study area (J. Smith pers. comm. 2007). The abundance and distribution of native species have been reduced significantly over time through human impacts. The interface with the bay provides habitat for several species of anadromous fish including steelhead/rainbow trout, which has been observed in both Coyote Creek and the Guadalupe River (Santa Clara Basin Watershed Management Initiative 2003).

Invertebrates

There are many thousands of invertebrate species in California, with an estimated 28,000 species of insects alone (California Department of Fish and Game 2003b). The south San Francisco Bay region and most of the study area ranks as medium in invertebrate species rarity within the state (California Department of Fish and Game 2003b). Most of that rarity is driven by unique grassland and scrub habitats that support rare species of plants. These rare plant species in turn support the complex life stages of many insects, especially butterflies and moths.

The biological diversity of invertebrates in Santa Clara County and the study area is largely unknown.

Vascular Plants

California has the highest overall plant diversity in the United States with almost 8,000 known species (Hickman 1993; Stein 2002). Santa Clara County's moderate size and diverse physical and climatic characteristics create the conditions for a moderate to high level of botanical diversity. Unique habitats like serpentine grasslands in the study area support many special-status species, some of which are covered in this Plan. Of 8,363 plant taxa in California in the CalFlora database, Santa Clara County supports 1,778 native plant taxa and 507 nonnative plant taxa, or 27% of the plant taxa in the state in CalFlora (CalFlora Database 2006)[13].

The exact number of vascular plants in the study area is unknown. However, floristic surveys of large areas of open space in the study area provide an indication of floristic diversity. For example, the Pine Ridge Association maintains a list of 675 vascular plants found in Henry W. Coe State Park (Pine Ridge Association 2006c).

3.3.5 Natural Communities and Land Cover Types

The NCCP Act requires that natural communities within the study area that could be affected by Plan implementation be identified in an NCCP. Natural communities are defined by the vegetative communities within them. Accordingly, the vegetative communities, or land cover types, within each natural community are described below and shown in **Figure 3-9**.

This Plan includes seven natural communities.

- Grassland.
- Chaparral and coastal scrub.
- Oak woodland.
- Riparian forest and scrub.
- Conifer woodland.
- Wetland.
- Open water.

[13] These values somewhat overestimate the actual number of plant taxa in California and Santa Clara County because species are counted separately from each variety or subspecies in the CalFlora database. For example, *Polygonum amphibium* is counted as a unique entry from *Polygonum amphibium* var. *emersum*.

In addition, two broad categories of non-natural land cover types are defined and described below.

- Irrigated agriculture.
- Developed.

The description of each natural community provides information on historic land cover, associated wildlife, ecosystem function, and threats. Each of the 37 land cover types used in this Plan is discussed in one of the natural communities, as shown in the hierarchy in **Table 3-1**. When data are available, vegetation associations are also described for each land cover type. Vegetation associations are distinct units of plant communities defined by the dominant species of plants that are consistently found on the landscape.

Quantitative data on vegetation and plant diversity is often lacking for regional conservation plans. However, a unique data set is available for the Santa Clara Valley HCP/NCCP. In the spring and summer of 2001 and 2002, botanists and volunteers from the CNPS and the CDFG conducted extensive quantitative sampling of vegetation along the approximately 7,000 acre Coyote Ridge (Evens and San 2004). The purpose of this study was to define and document the range of vegetation associations and plant diversity in the mostly serpentine communities of the ridge. Data from 200 locations were analyzed and grouped into discrete associations using standard cluster analysis and ordination techniques.

A total of 47 vegetation associations were defined and described in detail that support 329 unique species. Four of these associations were newly recognized and 32 of them were identified as provisional because they were based on less than 10 samples. Vegetations associations defined by this important study are summarized in this chapter under the relevant natural community as a way to describe the variety of vegetation associations within each land cover type. It is expected that many of these 47 vegetation associations occur elsewhere in the study area. However, it should be recognized that the relatively small sample area (only 1% of the study area) provides limited information on the vegetation diversity of the study area.

The results of the land cover mapping are summarized in **Table 3-7** and described below for each land cover type. See **Figure 3-10** for the land cover map using all land cover types.

Grassland

Grassland consists of herbaceous vegetation dominated by grasses and forbs. Grassland in the study area is classified into six land cover types.

- California annual grassland.
- Non-serpentine native grassland (not mapped).
- Serpentine bunchgrass grassland.

- Serpentine rock outcrop / barrens.
- Serpentine seep.
- Rock outcrop (non-serpentine).

CDFG considers serpentine bunchgrass grassland a sensitive biotic community (California Department of Fish and Game 2003b). The land cover types serpentine seep, serpentine rock outcrop / barrens, and rock outcrop (non-serpentine) are typically associated with grasslands so are also discussed in this natural community.

Historical Extent and Composition

Historical records do not provide definitive data on the distribution of native perennial grasslands, but research indicates human use of fire may have had a profound impact on the historic distribution and extent of grasslands. Prior to European settlement, native perennial grasslands in Santa Clara County were likely subject to regular burning by native American people. Keeley (2002) surmises that because dense scrub or chaparral had little value to native Americans, they used periodic burning to clear shrubs and provide habitat for fire-tolerant native grasses. Keeley (2002) also implies that the current mosaic of grassland is likely a result of historic vegetation management that favored open grasslands over chaparral.

Another human-made change to the landscape was initiated with the introduction and spread of many nonnative plants throughout California. The invasions began in 1769, when the first Spanish settlements were established at Monterey and San Diego, or possibly earlier. These introductions occurred by unassisted migration or by transport in the belongings or livestock of travelers from the Spanish settlements outside of California or in ship's cargo of coastal explorers. These non-native plant invaders included very aggressive annual grasses and forbs from the grasslands of the Mediterranean region that quickly replaced the natives, both with and without the influence of livestock grazing (Hendry 1931; Blumler 1992; Bartolome et al. 2007). The grazing of livestock in the study area by European settlers became more widespread after the gold rush of the 1850s. The combination of livestock grazing, drought, and spread of aggressive grasses and herbs dramatically reduced the abundance of native grasses and the extent of native grasslands throughout California (Bartolome et al. 2007). Grazing by livestock and wildlife continues today in almost all of the grasslands and other natural communities linked to grasslands (woodlands, riparian woodlands, and shrublands) of the County, although less intensively than in the past. While most grasslands in the County are now dominated by nonnative annuals, small patches of native grasses, below the resolution of the land cover map in this Plan, are found in many of these grasslands. There is some controversy over whether perennial grasses ever dominated California grasslands. It is likely that the Spanish mostly encountered annual grasslands that had a small representation of perennial species intermixed (Blumler 1992).

Further, recent scientific research suggests many of California's modern grasslands were not "grasslands," but might have been dominated instead by shrubs or annual forbs during the Native American period before arrival of the settlers and most of the invading non-native grasses (Hopkinson and Huntsinger 2005; D'Antonio et al. 2007). Schiffman (2007) suggests that drier valley and interior Coast Range "grassland" habitats were dominated by forbs during prehistoric times. Thus, without further study, we cannot be certain of the locations or extents of prehistoric grasslands in the County.

Common Wildlife Associations

Characteristic wildlife species in grasslands include reptiles such as western fence lizard (*Sceloporus occidentalis*), common garter snake (*Thamnophis sirtalis*), and western rattlesnake (*Crotalis viridis*); mammals such as black-tailed jackrabbit (*Lepus californicus),* California ground squirrel (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), western harvest mouse (*Reithrodontomys megalotis*), California vole (*Microtus californicus*), American badger (*Taxidea taxus*), and coyote (*Canis latrans*); and birds such as burrowing owl (*Athene cunicularia*), short-eared owl (*Asio flammeus*), horned lark (*Eremophila alpestris*), and western meadowlark (*Sturnella neglecta*). Annual grassland also provides important foraging habitat for turkey vulture (*Cathartes aura*), northern harrier (*Circus cyaneus*), American kestrel (*Falco sparverius*), white-tailed kite (*Elanus leucurus*), and red-tailed hawk (*Buteo jamaicensis*).

Grassland-associated wildlife species covered under this Plan that are known to occur in the study area include San Joaquin kit fox (*Vulpes macrotis mutica*), western burrowing owl (*Athene cunicularia hypugea*), California red-legged frog (*Rana draytonii*), California tiger salamander (*Ambystoma californiense*), western pond turtle (*Clemmys marmorata*), and tricolored blackbird (*Agelaius tricolor*) (**Table 3-5**). California red-legged frog and California tiger salamander breed in aquatic habitats (e.g., ponds) within grasslands, and use grasslands as movement and aestivation (summer hibernation) habitat. Western pond turtle use grassland land cover adjacent to aquatic habitat as year-round and movement habitat. Serpentine grassland provides valuable habitat in the study area for all life stages of the federally threatened Bay checkerspot butterfly (*Euphydryas editha bayensis*) (see the species account in **Appendix D** for more information). The butterfly also uses grasslands as movement corridors between isolated serpentine grassland patches. These grasslands also provide unique habitat for a variety of special-status invertebrates that are not covered by this plan, including several butterfly species and Hom's microblind harvestman (*Microcina homi*).

Grassland Land Cover Types

Within the Plan study area, California annual grassland was identified by its smooth, pale signature on aerial photograph, lacking the dark green signatures of woody plants taken during the summer months. Native grasslands could not be distinguished reliably on the available imagery.

California Annual Grassland

Annual grassland or *nonnative grassland* is an herbaceous plant community dominated by nonnative annual grasses (Holland 1986; Sawyer and Keeler-Wolf 1995). In the study area, annual grassland was mapped where grasses and forbs dominate the land cover and where trees and shrubs comprise less than 10% canopy cover. The dominant grasses in the study area generally consist of introduced annual grasses from the Mediterranean basin, including wild oats (*Avena barbata* and *A. fatua*), soft brome (*Bromus hordeaceus*), foxtail chess (*B. madritensis*), leporinum barley (*Hordeum murinum* ssp. *leporinum*), Italian ryegrass (*Festuca perennis* [*Lolium multiflorum*]), barbed goatgrass (*Aegilops triuncialis*), harding grass (*Phalaris aquatica*), shiver grass (*Aira caryophyllea*), rat-tail fescue (*Festuca* [*Vulpia*] *myuros*), ripgut brome (*Bromus diandrus*), nit grass (*Gastridium phleoides* [*G. ventricosum*]), bentgrass (*Polypogon* [*Agrostis*] *viridis*), and small fescue (*Festuca* [*Vulpia*] *microstachys*) (Evens and San 2004). The associated herbaceous cover includes native and nonnative forbs. Common species in the study area include many clover species (*Trifolium* spp.), filaree species (*Erodium* spp.), lupine species (*Lupinus* spp.), four-spot (*Clarkia purpurea* ssp. *quadrivulnera*), California poppy (*Eschscholzia californica*), purple owl's-clover (*Castilleja exserta*), Ithuriel's spear (*Triteleia laxa*), black mustard (*Brassica nigra*), starthistle species (*Centaurea* spp.), wavyleaf soap plant (*Chlorogalum pomeridianum*), common yarrow (*Achillea millefolium*), and common fiddleneck (*Amsinckia menziesii*).

California annual grassland occupies an estimated 81,795 acres (18%) of the study area (**Table 3-7** and **Figure 3-10**). This land cover type is generally found in valley bottoms. In the study area, it is found at low elevations along the eastern side of the Santa Clara Valley bordering the foothills, and on ridges on dry south- and west-facing slopes. Annual grassland is also common on both sides of the Pacheco Pass in the southern portion of the County. It is often found intermingling with oak woodlands and chaparral/scrub communities.

One covered plant that may be found on this land cover type is fragrant fritillary (*Fritillaria liliacea*). This species is restricted to specific habitat elements and micro-site characteristics within California annual grassland.

Native Grassland (Non-Serpentine)

Native, *non-serpentine grasslands* are patchily distributed in the study area and generally occur as small patches within the larger annual grassland complex. Accordingly, *native grassland* contains an abundance of nonnative annual grasses mixed with perennial grasses and forbs. Native grassland could not be distinguished from annual grassland on aerial photographs of the study area. Consequently, this land cover type was mapped as annual grassland.

Soils which support populations of native non-serpentine grasslands tend to be deep (50–100 cm), high in clay content with few rocks, and mostly on north-and east-facing slopes (Keeley 1993). There are several types of native grasses present in the study area, including purple needlegrass (*Stipa* [*Nassella*] *pulchra*), big squirreltail (*Elymus multisetus*), Torrey's melicgrass (*Melica torreyana*), creeping ryegrass (*Elymus* [*Leymus*] *triticoides*), small fescue, small-flowered needlegrass (*Stipa* [*Nassella*] *lepida*), one-sided bluegrass (*Poa secunda*), blue wildrye (*Elymus glaucus*), and California melica (*Melica californica*). Native, non-serpentine grasslands in the study area are characterized by the following grassland associations based on quantitative vegetation sampling conducted by the CNPS along extensive areas of Coyote Ridge (Evens and San 2004).

- **Italian ryegrass-purple needlegrass-Gambel's dwarf milkvetch-shining pepperweed (*Lepidium nitidum*) grassland association.** This association can be found on both serpentine and non-serpentine soils but typically occurs in herbaceous stands that have deep soils with high clay content (Evens and San 2004). Plants characteristic of this community are Italian ryegrass, purple needlegrass, hayfield tarweed (*Hemizonia congesta* ssp. *luzulifolia*), beaked cryptantha (*Cryptantha flaccida*), Douglas' microseris (*Microseris douglasii*), blue dicks (*Dichelostemma capitatum*), dwarf plantain (*Plantago erecta*), California poppy, Gambel's dwarf milkvetch, calf lotus (*Acmispon* [*Lotus*] *wrangelianus*) and reticulate seeded spurge (*Euphorbia spathulata*).
- **Italian ryegrass-purple needlegrass-coast range false bindweed grassland association.** This association can be found on both serpentine and non-serpentine soils but typically occurs in herbaceous stands that have deep soils with high clay content (Evens and San 2004). Plants characteristic of this community are Italian ryegrass, purple needlegrass, dwarf plantain, coast range false bindweed (*Calystegia collina*), California poppy, and common yarrow.
- **Creeping ryegrass-Italian ryegrass grassland association.** This association is found in the study area in both serpentine and non-serpentine soils of marine origin that experience seasonal flooding (Evens and San 2004). Characteristic species are creeping ryegrass, Italian ryegrass, common fiddleneck, wild oat, soft brome, reticulate seeded spurge, prickly lettuce (*Lactuca serriola*), and California blue-eyed grass (*Sisyrinchium bellum*).
- **Torrey's melicgrass grassland association.** This association is found on both non-serpentine and serpentine soils. Common species are Torrey's melicgrass, Italian ryegrass, soft brome, common yarrow, coast range false bindweed, shooting star species (*Dodecatheon* sp.), naked wild buckwheat (*Eriogonum nudum*), California poppy, and small fescue.
- **Big squirreltail (*Elymus multisetus*)-dwarf plantain-Italian ryegrass association.** Big squirreltail grassland is generally found on sedimentary and serpentine soils. Characteristic species are big squirreltail grass, Italian ryegrass, purple needlegrass, pine bluegrass, soft brome, California poppy, beaked cryptantha, dwarf plantain, California goldfields (*Lasthenia californica*), common yarrow, and wavyleaf soap plant.
- **Small fescue-dwarf plantain grassland association.** Small fescue grassland is typically found on well-developed soils on serpentine and on sedimentary soils that are mesic in spring. Common species are small fescue, common yarrow, soft brome, naked wild buckwheat, California poppy, Italian ryegrass, dwarf plantain, wavyleaf soap plant, Italian ryegrass, and common California-aster (*Corethrogyne* [*Lessingia*] *filaginifolia*).

The extent of non-serpentine native grassland in the study area is unknown.

No covered plants may be found on this land cover type.

Serpentine Bunchgrass Grassland

Serpentine bunchgrass grassland occurs on ultramafic soils derived from serpentinite. Serpentine soils generally have lower overall cover of vegetation as well as lower cover of nonnative species than annual grasslands, and are characterized by low plant growth and productivity (McNaughton 1968; Holland 1986). This is due in large part to the high content of heavy metals in the soil such as chromium, nickel, and cobalt which are toxic to most plants, very low calcium/magnesium ratios, unusually high levels of iron, and limiting levels of nitrogen, phosphorous, potassium, and calcium, all of which are important plant nutrients (Kruckeberg 1984). Many serpentine species are partially or completely confined to growing on this substrate (Safford et al. 2005). Native bunchgrasses in serpentine habitat are generally similar to those in non-serpentine habitats, although serpentine populations may be more tolerant of heavy metals present in the soil and may have lower growth rates compared to non-serpentine populations (Huntsinger et al. 1996).

Serpentine bunchgrasses typically occur in patches of both single and multiple species (McCarten 1987). As noted above, nonnative annuals are much less dominant in serpentine areas, although increasing nitrogen deposition from air pollution has increased the productivity of serpentine soils and allowed a greater number of nonnatives to invade (Evens and San 2004; Harrison et al. 2003; Weiss 1999). Native grasses typically found on serpentine soils in the study area include big squirreltail, creeping ryegrass, purple needlegrass, Torrey's melicgrass, and small fescue. Some common herbaceous species are fringed sidalcea (*Sidalcea diploscypha*), jeweled onion (*Allium serra*), serpentine linanthus (*Leptosiphon* [*Linanthus*] *ambiguus*), and Franciscan wallflower (*Erysimum franciscanum*) (Evens and San 2004).

Although the total coverage of serpentine soils is relatively small state-wide (1.5%), 13% of plant species endemic to California are serpentine endemics (Safford et al. 2005). Many of these occur in the San Francisco Bay area. There are a variety of ultramafic affinities for serpentine species that can vary by geography. For instance, serpentine species can be strict endemics (95% of the time they are found growing on serpentine), strong indicators (about 70% of the time they are found growing on serpentine), and weak indicators (about 60% of the time they are found growing on serpentine). The herbaceous species listed above have serpentine affinities that fall between strict endemic and strong indicator.

Serpentine grasslands in the study area are characterized by the following associations based on quantitative vegetation sampling conducted by CNPS along extensive areas of Coyote Ridge (Evens and San 2004).

- **Italian ryegrass-purple needlegrass-Gambel's dwarf milkvetch-shining pepperweed grassland association.** Plants typical of this association can be found above in native grasslands. Additional species characteristic of this association on serpentine soils are smooth lessingia (*Lessingia micradenia* var. *glabrata*), most beautiful jewel-flower (*Streptanthus albidus* ssp.

peramoenus), and Santa Clara Valley dudleya (*Dudleya abramsii* ssp. *setchellii*).

- **Italian ryegrass-purple needlegrass-coast range false bindweed grassland association.** Plants typical of this association can be found above in native grasslands. Additional species characteristic of this association on serpentine soils are smooth lessingia, Mt. Hamilton thistle (*Cirsium fontinale* var. *campylon*), and jeweled onion.
- **Creeping ryegrass-Italian ryegrass grassland association.** Plants typical of this association can be found above in native grasslands. An additional species characteristic of this association on serpentine soils is smooth lessingia.
- **Torrey's melicgrass grassland association.** Plants typical of this association can be found above in native grasslands. Additional species characteristic of this association on serpentine soils are smooth lessingia, jeweled onion, and Santa Clara Valley dudleya.
- **Big squirreltail (*Elymus multisetus*)-dwarf plantain-Italian ryegrass association.** Plants typical of this association can be found above in native grasslands. Additional species characteristic of this association on serpentine soils are jeweled onion and most beautiful jewel-flower. Other occasional associates are Santa Clara Valley dudleya and serpentine linanthus.
- **Small fescue-dwarf plantain grassland association.** Plants typical of this association can be found above in native grasslands. Additional species characteristic of this association on serpentine soils are Franciscan wallflower, jeweled onion, and most beautiful jewel-flower. Fragrant fritillary and serpentine linanthus also occasionally may be present.

Covered plants that may be found in serpentine bunchgrass in the study area include the following: Tiburon Indian paintbrush (*Castilleja affinis* ssp. *neglecta*), coyote ceanothus (*Ceanothus ferrisiae*), fragrant fritillary, Santa Clara Valley dudleya, smooth lessingia, Mt. Hamilton thistle , Metcalf canyon jewel-flower, and most beautiful jewel-flower (Evens and San 2004; California Natural Diversity Database 2008, 2012; also see **Table 3-6**). These species are restricted to specific habitat elements and micro-site characteristics within serpentine bunchgrass grassland.

Certain species not considered serpentine endemics or indicators but commonly found in serpentine soil areas, host or provide nectar for the federally threatened Bay checkerspot butterfly. Such species include dwarf plantain, purple owl's-clover, California goldfields, common muilla (*Muilla maritima*), and lomatium species (*Lomatium* spp.) (Weiss 1999).

Serpentine bunchgrass grassland occupies approximately 10,308 acres (2.2%) of the study area (**Table 3-7** and **Figure 3-10**). This land cover type was mapped where grasslands intersected either serpentine soils or serpentine bedrock (**Figure 3-4**). In the study area, serpentine bunchgrass grassland is found primarily northwest of Anderson Lake along Coyote Ridge and the Silver Creek Hills. Smaller patches of serpentine bunchgrass grassland can be found in the

Santa Theresa Hills, on Communications Hill, Tulare Hill, and west of Morgan Hill.

Serpentine Rock Outcrop / Barrens

Serpentine rock outcrops are exposures of serpentine bedrock that typically lack soil and are sparsely vegetated. Serpentine barrens are areas of exposed serpentine soil that support little vegetation. They were identified based on visible rock outcroppings or barren areas on the aerial imagery intersecting with the serpentine rock or serpentine soils layers respectively; there was no minimum mapping unit. Covered plants that may be found on this land cover type include Metcalf canyon jewel-flower, most beautiful jewel-flower, smooth lessingia, and Santa Clara Valley dudleya (California Natural Diversity Database 2008, 2012; California Native Plant Society 2007).

This land cover type is likely underrepresented in the land cover map for the study area (Kruckeberg 1984; Wagner et al. 1991) because these features are difficult to see on aerial photographs, and were difficult to recognize in the field from a distance.

Covered plants that may be found in serpentine rock outcrop/barrens in the study area include the following: Tiburon Indian paintbrush, Santa Clara Valley dudleya, smooth lessingia, Metcalf canyon jewel-flower, and most beautiful jewel-flower (**Table 3-6**). These species are restricted to specific habitat elements and micro-site characteristics within serpentine rock outcrop.

Serpentine rock outcrops occupy an estimated 260 acres (0.05 %) of the study area (**Table 3-7** and **Figure 3-10**). This land cover type is found strictly in areas of serpentine soils or geology. In the study area, serpentine rock outcrops are found in the same locations as serpentine bunchgrass grassland.

Serpentine Seep

Seeps are otherwise dry areas where water penetrates the surface and creates a small wetland habitat that supports wetland vegetation. These provide a source of drinking water for wildlife in the area. Serpentine seeps typically occur within a matrix of serpentine grassland so they are discussed in the grassland natural community. Serpentine seep vegetation associations found in the Plan study area are described below (Evens and San 2004).

- **Mt. Hamilton thistle-twotooth sedge (*Carex serratodens*)-meadow barley forbland[14] association.** This association is found exclusively on serpentine seeps. Plants characteristic of this association are Mt. Hamilton thistle, twotooth sedge, meadow barley (*Hordeum brachyantherum*), hayfield tarweed, narrow-leaved wild-lettuce (*Lactuca saligna*), common yarrow, California poppy, Italian ryegrass, meadow barley, irisleaf rush (*Juncus xiphioides*), and seep monkey flower (*Mimulus guttatus*). Additional common species in this association are bentgrass, purple needlegrass, hoary coffeeberry (*Frangula californica* ssp. *tomentella* [*Rhamnus tomentella*]),

[14] A *forb* is another term for an herbaceous plant. A *forbland* is a vegetation association dominated by forbs (similar in concept to a grassland).

rabbit's foot (*Polypogon monspeliensis*), smooth lessingia, and most beautiful jewel-flower.

- **Mt. Hamilton thistle-hayfield tarweed forbland association.** This association is found exclusively on serpentine seeps. Plants characteristic of this association are Mt. Hamilton thistle, hayfield tarweed, irisleaf rush, rabbit's foot, hoary coffeeberry, and smooth lessingia.
- **Mt. Hamilton thistle-seep monkey flower-short-spiked hedge nettle forbland association.** This association is found exclusively on serpentine seeps. Plants characteristic of this association are Mt. Hamilton thistle, sourclover (*Melilotus indicus* [*M. indica*]), seep monkey flower, short-spiked hedge-nettle (*Stachys pycnantha*), yellow star thistle (*Centaurea solstitialis*), soft brome, California poppy, irisleaf rush, Italian ryegrass, common yarrow, California sagebrush (*Artemisia californica*), foxtail chess, Pacific false bindweed (*Calystegia purpurata*), medusa-head (*Elymus* [*Taeniatherum*] *caput-medusae*), and most beautiful jewel-flower.
- **Irisleaf rush herbaceous association.** This association is found exclusively on serpentine seeps. Plants characteristic of this association are irisleaf rush, Italian ryegrass, twotooth sedge, Mt. Hamilton thistle, Baltic rush (*Juncus balticus*), hyssop loosestrife (*Lythrum hyssopifolia*), and rabbit's foot.
- **Leather oak-hoary coffeeberry-bigberry manzanita shrubland.** This association is found in serpentine seeps and in riparian drainages on serpentine. Leather oak (*Quercus durata*) and hoary coffeeberry are co-dominant, followed by bigberry manzanita (*Arctostaphylos glauca*). The shrub layer has sparse to dense coverage (9–70% on Coyote Ridge) of Italian ryegrass, slender wild oat, ripgut brome, hayfield tarweed, seep monkey flower, and Mt. Hamilton thistle are all common in the open herb layer.

One covered plant, Mt. Hamilton thistle, is restricted to serpentine seeps and streams and drainages through serpentine soils (**Table 3-6**). Serpentine seeps were mapped on 34 acres (0.01%) of the study area (**Table 3-7** and **Figure 3-10**).

Rock Outcrop (Non-Serpentine)

Frequently encountered features in grasslands are *rock outcrops*, which are exposures of bedrock that typically lack soil and have sparse vegetation. Within the study area, several types of rock outcrops are present and are derived from sedimentary, volcanic, and metamorphic sources. Rock outcrops identifiable on aerial photographs were mapped based on their unique aerial photograph signatures. Rock outcrop signatures appear as textured areas with mottled coloring that contrasted in color and texture with the surrounding cover types on aerial photographs. There was no minimum mapping unit.

Rock outcrops host common wildlife species such as western fence lizard and western rattlesnake. These species may use outcrops for basking and as foraging areas. Common birds include rock wren (*Salpinctes obsoletus*) and several species of raptors that use rock outcrops for nesting or roosting. Rock outcrops with crevices or caves could host roosting bats.

Most beautiful jewelflower may be found on non-serpentine rock outcrops (**Table 3-6**).

Rock outcrops are a rare land cover type, totaling 87 acres (0.02%) of the study area (**Table 3-7** and **Figure 3-10**). They are primarily found in annual grasslands although they also can be present in chaparral and oak woodlands. This land cover type is likely underrepresented in the land cover map because these features are difficult to see on aerial photographs, particularly if they were below a chaparral or woodland canopy, and were difficult to recognize in the field from a distance. Accordingly, many small areas of rock outcrops are likely included in the chaparral/scrub, grassland, and oak woodland land cover types.

Ecosystem Functions

Function and Integrity

The grassland types within the study area function as a dominant natural community, linking small and large patches of all other natural communities in the landscape such as oak woodland, riparian and aquatic communities, northern mixed chaparral/chamise chaparral, and northern coastal scrub/Diablan sage scrub. Rock outcrops, barrens, and seeps are contained within the larger matrix of grasslands, and in some cases, the functions and threats to the integrity of these land cover types differs from the larger grassland matrix. This section primarily addresses the grassland types. Differences, where relevant, are noted for the small-scale land cover types contained within grasslands.

Grasslands provide critical upland habitat for a variety of amphibians dependent on adjacent aquatic habitats such as ponds and seasonal wetlands. These amphibians move through grasslands during the rainy season to disperse to other aquatic sites, and may reside in moist refuges, such as burrows and piles of litter and debris, within grasslands during the dry season. Grasslands are important for burrowing rodents such as ground squirrels and gophers. Rodent burrows, in turn, provide key habitat for a variety of other species, including burrowing owls. The diverse and abundant rodent community supports an assemblage of raptors that feed on them, including golden eagle (*Aquila chrysaetos*), northern harrier, and white-tailed kite. Serpentine grasslands are important habitat for all life stages of the federally threatened Bay checkerspot butterfly, and a host of other rare species.

Grasslands also help maintain water supplies and water quality through soil moisture retention and infiltration and by filtering out sediment, nutrients, and pathogens from run-off. They provide wildlife habitat, storage of carbon, and forage for grazing livestock. The key characteristics of grassland habitat that contribute to these functions are a high cover of herbaceous vegetation. A mix of woody cover in grassland (mosaic of shrubs or savanna) is also important to resist soil erosion and mass-wasting, and benefits some special-status animals.

The replacement of native grasses and herbs by fast-growing nonnative annual grasses and herbs has had a profound effect upon ecosystem functions in grasslands. The complex system of native grasses, forbs, shrubs, and animals of grassland habitats, plus the effects of lightning-caused wildfire and Native American management during prehistoric times has been dramatically altered. For example, the exotic annuals germinate and grow faster and can deplete soil moisture and reduce light and nutrient availability to the natives. However, seed limitation due to low production or small populations may also limit native grass establishment. Both native and non-native shrubs and trees can invade California grasslands, causing changes in fire fuel structure, carbon storage, animal habitat, and facilitation of the establishment of other woody plants. The exotic grasses and forbs have a larger and more persistent seed bank than the natives, and distribute seeds abundantly as seed rain. The exotic species can thus rapidly colonize disturbance areas, such as gopher mounds, and inhibit establishment of the native species. Grazing livestock are likely to be important dispersal agents for the exotic plants, but grazing intensity has not been linked by scientific evidence to current invasions of exotic plants into California grasslands (Jackson and Bartolome 2007).

The widespread occurrence of non-native species has altered the response of California grasslands to burning. Increased fuel loading around trees and native grasses can result in reduced survival of the native grasses. Non-native grasses are favored where atmospheric nitrogen deposition has increased or where nitrogen-fixing shrubs, such as brooms (*Genista* spp. or *Cytisus* spp.) have invaded and elevated soil nitrogen. Serpentine soils are particularly vulnerable to such means of invasion. Phenology of the converted grassland is dramatically different from that of the prehistoric native grasslands. The exotic annual grasses germinate and grow in synchrony with the rains of fall through spring, while the native perennial grasses extend their growth and transpiration of soil moisture into the summer months. The roots of the exotic annual grasses are generally less deep that those of the native perennial grasses, which can tap deeper soil moisture. The absence of perennial grasses in the converted grasslands can lead to reservoirs of deep soil moisture during the summer, which may be accessed by deep-rooted pest plants, such as yellow starthistle. Different microbial compositions have been found in the soils of California grasslands and planted containers with exotic annual versus native perennial grasses, but less is known about nutrient feedbacks and effects on soil structure. In a few cases, pathogens of grassland plants also appear to facilitate dominance of the exotic species.

Natural Disturbance

The key natural disturbances that have shaped and continue to influence grassland composition and extent are fire and grazing. **Figure 3-11** shows areas currently grazed in the study area. Both of these disturbances are now largely controlled by humans. Therefore, by extension, the continuing introductions and naturalization of aggressive non-native plants should also be considered an important factor influencing grasslands, and one also largely controlled by humans (Randall and Hoshovsky 2000). Nitrogen deposition into grasslands near air pollution sources and the resultant increase in productivity of the soils that has facilitated the increased invasion by nonnative species is a relatively recent anthropogenic disturbance. The disturbances related to nitrogen deposition and non-native plant introductions are discussed further under *Threats* below.

Periodic fire is an important influence on the grassland community. Historically and prehistorically, fires from both lightning strikes and human ignition kept woody vegetation from invading grassland (where the soil conditions are appropriate) and converting it to coastal scrub or oak woodland. Grassland was likely the dominant vegetation community, especially near prehistoric and historic settlements and travel routes, and in association with brush clearing for “rangeland improvements” to increase livestock forage (Reiner 2007; Tyler, Odion, and Callaway 2007). The prehistoric burning apparently resulted in spatially patchy grasslands in a mosaic with woody vegetation (Keeley 2002). The grasslands were kept open by fire, drought, and possibly some influence of native grazers, such as tule elk and pronghorn. However, prior to Native American occupancy and their frequent burning, Ford and Hayes (2007) speculate that many of the grasslands within the range of coyotebrush would have been brushlands. Today, in the absence of frequent extensive fire and moderate or higher intensity livestock grazing, the grasslands within the range of coyotebrush have succeeded or will succeed in the future to northern coastal scrub and eventually mixed woodland, except on the hottest south-facing slopes and shallow soils.

Prescribed burning is considered an important management tool in grasslands and other natural communities, but it has significant practical limitations. Such burning is becoming increasingly difficult to implement due to cost, safety concerns from expanding urban and rural development, and difficulty obtaining permits because of air quality concerns. It has not been feasible in most places to burn frequently enough to control the spread of woody species into existing grassland, or to reduce the cover of woody vegetation within grasslands, because of the natural resistance and resilience of the woody plants to a single burn (Ford and Hayes 2007). Attempts to restore pre-historic or historic fire regimes in grasslands in order to increase native grassland plants is not recommended due to uncertainties of the prehistoric grassland characteristics and the risk of facilitating invasions by non-native plants (Reiner 2007). However, livestock grazing has continued on most rangelands of the study area (see **Figure 3-11**) since introduction by the Spanish settlers, and its effects on both fire hazard reduction and shrub invasion are understood and can be prescribed (Ford and Hayes 2007). While early livestock grazing practices are acknowledged to have been excessive and damaging to grasslands and associated resources in some places, they are far less so today. In fact, livestock grazing in the region is regarded as generally beneficial and has maintained suitable habitat conditions for many special-status grassland-dependent species since the conversion from native species to exotic annuals in the grasslands in the 18th century or earlier.

Grassland is considered a fire-tolerant community. The direct effect of fire on grassland is to remove much or nearly all of the aboveground herbaceous biomass, depending on fire severity. Often the low-intensity prescribed fire moves so quickly and the residue (or thatch) is moist enough that the fire burns only above the lower few centimeters of material, leaving much unburned or only charred on the ground. Fires in grassland are described as *stand-replacing fires*. However, the immediate effect of this biomass removal on annual grasses is negligible, as they have typically completed their growth cycle before fires occur (Howard 1998). Their seeds are typically well dispersed, and many can be protected by the cover of litter and in cracks in the soil surface over which a fire passes. Perennial bunchgrasses suffer a temporary loss of foliage, but typically regenerate immediately through tillering and regrowth of green foliage that typically remains in the center of grass tussocks (Steinberg 2002).

The immediate effect of a fire in grasslands is typically an increase in annual forb germination and flowering and an increase in overall productivity in response to the light and nutrients made available by the removal of the thatch layer during the following growing season (Harrison et al. 2003). In the two to three years following a fire, the elimination of the thatch layer (if present) may shift the species composition of grasslands towards annual forbs and small-seeded species such as purple needlegrass and little quaking grass (*Briza minor*) (Howard 1998; Steinberg 2002). In the absence of grazing, however, a thatch layer can re-establish (depending on favorable weather), and this effect will disappear. Burning appears to have little long-term effect on annual grassland (Heady 1988; Paysen et al. 2000; Kyser and Di Tomaso 2002). In grasslands that are already dominated by nonnative annual grasses, nonnatives may increase their dominance following fire by outcompeting natives for the newly available space and light. Native grasses may increase their dominance in serpentine grasslands following fire through the same mechanism (Harrison et al. 2003).

Livestock grazing within grasslands is an important disturbance that mimics some of the functions of fires and of native herbivores that are no longer present (e.g., Tule elk, pronghorn). Livestock grazing is also an important management tool to combat relatively new threats such as loss of suitable habitat for special-status species due to dense growth during wet years and invasions of woody plants (Ford and Hayes 2007), and increased invasive nonnative plants in serpentine grasslands due to atmospheric nitrogen deposition (Weiss 1999). The primary drivers of annual grassland composition are the environmental conditions of each site, including soils and annual weather. Bartolome (2011) has estimated that annual weather fluctuations cause about 80% of the shifts in composition of California annual grasslands. Management, including grazing systems, therefore has a limited influence. As a result, studies of grazing effects on native species populations have mixed results, and must be interpreted carefully.

Properly timed grazing can be used to suppress non-native herbaceous competition with native plants, and may favor native grasses and wildflowers. The density and vigor of native perennial grasses can be improved when intensive spring grazing is curtailed just before the existing native perennial grasses re-grow, flower, and set seed (Menke 1992). This specialized grazing removes much of the density and mass of the non-native annual grasses through their growing season, which is shorter than for the native perennial grasses. Curtailing grazing at that time simultaneously allows the native perennial grasses to grow, flower, and set seed before the soil moisture is exhausted. Other research has shown mixed results, and suggests caution in grazing prescriptions to favor native grasses. A study at Jepson Prairie by Dyer, Fossum, and Menke (1996) found that grazing was not effective to increase purple needlegrass and that climate is the more influential factor. Hatch et al. (1999) suggest that different native grasses and forbs have different and sometimes conflicting responses to management, and therefore more research is needed to guide grazing and burning practices. In a study of coastal prairie, Hayes and Holl (2003) found that native grasses were not more abundant where grazed than where ungrazed. However they found native forbs were more abundant where grazed due the suppression of non-native herbaceous competition and build-up of thatch. Spring and summer wildflowers of grasslands are typically more showy where grazing has occurred (Edwards 1992). Furthermore, Hayes and Holl (2011) found that stands of native grasses are slow to respond to treatments, and fluctuated in response to multiple factors other than management, including annual weather patterns; and that grazing, even when controlled with specific frequencies, holds little promise for increasing native species over the long term.

Grazing may have little effect on species diversity in serpentine grasslands (Harrison 1999). In one case in Santa Clara County reported by McCarten (1987), grazing was associated with a decrease in native bunchgrass species compared to recently ungrazed sites, but that could have been related to non-grazing management or microhabitat differences. Because invasive nonnatives are generally not tolerant of serpentine soils, these species are less invasive in serpentine bunchgrass grasslands than in non-serpentine grasslands (Harrison 1999). Studies in Bay checkerspot butterfly habitat have found that livestock grazing is necessary to prevent nonnative species from becoming dominant, and promote the establishment and persistence of nectar species preferred by the Bay checkerpot butterfly (Harrison 1999; Weiss 1999; Weiss and Wright 2005, 2006; Weiss, Wright, and Niederer 2007). Harrison and Viers (2007) caution that the known invasions of non-natives into serpentine grasslands can be partly a result of slower rates of spread, and that factors other than nitrogen deposition could undermine the resistance of these grasslands, including evolution of serpentine-tolerance in existing non-natives, arrival of new serpentine tolerant non-natives (notably goatgrass [*Aegilops cylindrica*] and medusa-head), and modification of the soils to favor more invasions. They also caution that livestock grazing and infrequency of fire in serpentine grasslands can contribute to declines in native species.

In general, livestock grazing has been associated with benefits to serpentine grasslands (Harrison and Viers 2007). Reported studies indicate that removal of grazing had either no effect on plant species composition or the abundance of native forbs decreased, while grazing increased diversity of native annual forbs. Low-statured native annual forbs are expected to benefit from moderate grazing by reducing the thatch produced by the non-native annual grasses.

Grazing might have a negative effect on the physical structure and native seed banks of serpentine seeps, serpentine rock outcrops, and serpentine barrens that are contained within the larger grassland matrix, but no scientific research has been published on this topic. These small land cover types might be somewhat sensitive to cattle traffic. Most seep soils are moist or saturated for most or all of the year, while rock outcrop/barrens usually have low plant cover and minimal soil and seed bank accumulations. Depending on intensity and frequency of grazing traffic, this can be a long-term effect that is very difficult to restore. Fencing can be used to eliminate or minimize access by livestock to sensitive serpentine seeps, rock outcrops, or barrens.

Threats

The primary known threats to conservation of California grasslands are: climate change; human development (habitat destruction and fragmentation); invasive species (pathogens, plants, animals); altered disturbance regimes; and air pollution.

The conservation threats associated with human development, including habitat destruction and fragmentation due to conversion of natural grasslands to residential and commercial development, conversion to cultivated agriculture, road construction, and the patterns of such development across the landscape, are the subjects of this Habitat Plan, and are discussed in other chapters.

The threats to conservation of grasslands posed by continuing invasions and infestations of aggressive non-native plants have been described above. In general, and perhaps most significantly, the non-native grasses and forbs of modern grasslands now pose the threat of significant habitat degradation if not grazed by livestock or otherwise treated to maintain suitable habitat structure and reduce competition.

Atmospheric nitrogen enrichment fosters the invasion of nonnative species, which replace native species. This is a threat in all grasslands downwind of air pollution sources, but particularly in serpentine grasslands, where the nectar plant hosts to the bay checkerspot butterfly are affected (Weiss 1999). Absence of grazing thus threatens the butterfly populations. In Santa Teresa County Park and other locations, several populations of Bay checkerspot butterfly declined substantially after grazing was halted. Once grazing ceased, the numerous non-native grasses and forbs present in the serpentine grasslands grew tall and dense each year, and through competition reduced the butterfly's host plants (U.S. Fish and Wildlife Service 2001). The USFWS recognizes activities that threaten the butterfly's critical habitat, include ground disturbance, removing vegetation, altering or removing grazing practices, application of pesticides and biological agents, and some recreational activities. In the case of Santa Teresa County Park, the USFWS recognized that re-introduction of grazing would be needed to ensure recolonization of the butterfly.

In addition, introduced pathogens can indirectly facilitate the invasions of non-native plants, reduce savanna and woodland canopies and thus expand grasslands, and reduce populations of key native grassland birds and rodents (D'Antonio et al. 2007). The threats to conservation of grasslands posed by altered disturbance regimes due to fire and grazing have been discussed above. Studies have demonstrated that well-managed livestock grazing within grasslands is critical to maintain populations of Bay checkerspot butterfly (Harrison et al. 2003; Weiss and Wright 2005, 2006; Santa Clara Valley Transportation Authority 2006). However, as noted above, grazing might be detrimental to serpentine seeps and most rock outcrop/barrens. The threat of reduction or elimination of grazing as a habitat management has also been discussed above.

Serpentine seeps are a type of wetland and many of the threats discussed in the wetland section below are applicable to seeps within grasslands. In particular, alteration of hydrologic regimes by adjacent land uses and development can change and in some case remove the water source for these seeps. This can result in partial or complete loss of seep wetlands.

Other threats to grasslands include feral pigs, power lines, off-road vehicle activity, improper burning regimes, and road and trail construction (Evens and San 2004).

Chaparral and Northern Coastal Scrub

Chaparral shrub communities are found throughout California on rocky, porous, nutrient-deficient soils and on steep slopes up to 2000 m in elevation (Keeley 2000). These communities are dominated by densely packed and nearly impenetrable drought-adapted everygreen woody shrubs, 1.5–4 meters tall, that possess small, thick, leathery sclerophyllous leaves (Hanes 1988; Keeley 2000). Herbaceous and arboreal growth forms are often lacking or play minor roles in this community (Keeley 2000). Chaparral species have both deep and shallow roots that allow them to tap water in several soil layers (Schoenherr 1992). The deep roots also allow chaparral to tolerate summer drought conditions and stay active during this period of water stress. Chaparral is divided into two land cover types for this Plan.

- Northern mixed chaparral/chamise chaparral.
- Mixed serpentine chaparral.

CDFG considers the latter a sensitive biotic community (California Department of Fish and Game 2007). *Northern coastal scrub*, in comparison, is generally characterized by low shrubs, usually 0.5–2 meters tall with soft non-scerophyllous leaves, interspersed with grassy openings (Holland 1986). Although coastal scrub is found in both northern and southern California, the form and variety of species varies greatly between the two regions. Coastal sage scrub in southern California is characterized by drought-deciduous shrubs that lose their leaves with the onset of arid summer conditions. In southern California this community lacks a significant herb layer. Northern coastal scrub is characterized by the absence of drought-deciduous shrubs and the presence of an herb-rich community, which is likely a result of plentiful annual rainfall and regular summer fog (Heady et al. 1988; California Partners in Flight 2004). Northern coastal scrub is also less diverse floristically than coastal sage scrub and shrubs are generally taller and more densely spaced (California Partners in Flight 2004). The range of this northern community can be defined as a narrow coastal strip from southern Oregon to Pt. Sur in Monterey County (Holland 1986; Heady et al. 1988). Northern coastal scrub in this study was divided into two land cover types.

- Northern coastal scrub/Diablan coastal scrub.
- Coyote brush scrub.

Historical Extent and Composition

Native Americans frequently burned shrublands to encourage grass and forb development as dense scrub or chaparral had little value to them (Keeley 2002). A fire-return interval of more than once or twice per decade is detrimental to non-sprouting shrubs such as most *Ceanothus* and *Arctostaphylos* species and tends to promote the reduction of shrublands in favor of grasslands (Keeley 2002). With the Spanish and Mexican settlement, most of the burning by native Americans stopped and fire frequency declined (Greenlee and Langenheim 1990); however, ranchers still burned chaparral areas to expand the prairie for pasture (Greenlee and Langenheim 1990). With the influx of people from the Gold Rush of 1849, rangelands became crowded and settlers increased the conversion of shrublands to nonnative grasslands (Keeley 2004). The historic extent and composition of shrublands in the study area is unknown. However, the fact that chaparral and shrublands are so common today suggests that the study area may not have seen the type conversion of chaparral to grassland experienced in other parts of California.

Common Wildlife Associations

Common wildlife species that use chaparral and scrub habitats in the study area include gopher snake (*Pituophis melanoleucus*), western rattlesnake, western fence lizard, brush rabbit (*Sylvilagus bachmani*), California pocket mouse (*Perognathus californicus*), Botta's pocket gopher, California ground squirrel, spotted skunk (*Spilogale gracilis*), mule deer, coyote, and bobcat (*Lynx rufus*). Common bird species include mourning dove (*Zenaida macroura*), California quail (*Callipepla californica*), Anna's hummingbird (*Calypte anna*), western scrub-jay, Bewick's wren (*Thryomanes bewickii*), California towhee (*Pipilo crissalis*), lesser goldfinch (*Carduelis psaltria*), fox sparrow (*Passerella iliaca*), white-crowned sparrow (*Zonotrichia leucophrys*), and dark-eyed junco (*Junco hyemalis*).

Chaparral and Northern Coastal Scrub Land Cover Types

Northern Mixed Chaparral/Chamise Chaparral

Northern mixed chaparral/chamise chaparral is classified by Holland (1986) as "broad-leaved sclerophyll shrubs, 2–4m tall, forming dense, often nearly impenetrable vegetation…[with] usually little or no understory vegetation [and] often considerable accumulation of leaf litter." Northern mixed chaparral/chamise chaparral apppeared darker green in color than other chaparral types in all seasons, and frequently occupied larger areas. Chamise chaparral was originally split into a separate land cover type but could not be distinguished on the aerial photograph from northern mixed chaparral.

Dominant shrubs in this community in the study area are chamise (*Adenostoma fasciculatum*), manzanita (*Arctostaphylos* spp.), scrub oak (*Quercus berberidifolia*), and ceanothus (*Ceanothus* spp.). Other important species are toyon (*Heteromeles arbutifolia*), coffeeberry (*Frangula* [*Rhamnus*] *californica*), madrone (*Arbutus menziesii*), California bay (*Umbellularia californica*), birchleaf mountain-mahogany (*Cercocarpus betuloides*), poison-oak (*Toxicodendron diversilobum*), bush monkey flower (*Mimulus aurantiacus*), and California yerba santa (*Eriodictyon californicum*). Some chaparral stands may be almost entirely composed of dense stands of chamise (Holland 1986). Northern mixed chaparral/chamise chaparral in the study area includes the following shrubland associations based on quantitative vegetation sampling conducted by the CNPS along extensive areas of Coyote Ridge (Evens and San 2004):

- **Chamise (pure) shrubland association.** Chamise is the dominant species in this association of dense shrubs[15] that generally occurs on extremely dry sites on south-facing, moderately steep to steep slopes. The herbaceous component is minor and sometimes absent in this association. Additional species which may have sparse representation are black sage (*Salvia mellifera*), coast live oak (*Quercus agrifolia*), wild mustard (*Hirschfeldia incana*), toyon, California cudweed (*Pseudognaphalium* [*Gnaphalium*] *californicum*), Napa star thistle (*Centaurea melitensis*), coyote brush (*Baccharis pilularis*), buck brush (*Ceanothus cuneatus*), California yerba santa, and silk tassel species (*Garrya* spp.).
- **Chamise-bigberry manzanita-bush monkey flower shrubland association.** This association of open to dense shrubs can be found on both serpentine and non-serpentine soils. The understory herbaceous layer is a small component of the community and is relatively open. The dominant shrubs are chamise and bigberry manzanita. Bush monkey flower and redberry buckthorn (*Rhamnus crocea*) are present in this shrubland. Other species that sometimes are present in this association are Torrey's melicgrass, California sagebrush, woolly-fruited lomatium (*Lomatium dasycarpum*), chaparral silk tassel (*Garrya congdonii*), hounds tongue (*Cynoglossum grande*), wavyleaf soap plant, coyote brush, scarlet pimpernel (*Anagallis arvensis*), and shiver grass.
- **Chamise-black sage (pure) shrubland association.** This association features chamise and black sage as co-dominants on south-facing slopes. Bigberry manzanita is present with lower coverage. There may also be a small open hardwood overstory component and herbaceous layer. Other species which may be present but sparse are slender wild oats, lichen, small-flowered needlegrass, California sagebrush, ceanothus species and coast live oak.
- **Bigberry manzanita-mixed (California sagebrush-black sage) shrubland association.** This mixed shrubland is found on serpentine and non-serpentine soils. Bigberry manzanita is dominant in a layer of somewhat openly spaced to more densely packed shrubs. There is an herbaceous understory layer and a small tree layer comprising conifers and hardwoods. Additional shrubs that may be found are California sagebrush, black sage, and less frequently chamise. Grasses commonly present are small-flowered

[15] On Coyote Ridge, chamise has an absolute cover of 50–60% (Evens and San 2004).

needlegrass, foxtail chess, slender wild oats, and Italian ryegrass. Coast live oak and foothill pine (*Pinus sabiniana*) may be present in the overstory.

- **Coyote brush/annual grass shrubland association.** This association consists of coyote brush, which is dominant in an open canopy, and a continuous herbaceous understory composed primarily of grasses with wild oats as the dominant. Additional grasses include ripgut brome, soft chess, Italian ryegrass, foxtail chess, and purple needlegrass. Other herbaceous elements include turkey mullein (*Croton* [*Eremocarpus*] *setigerus*), yellow star thistle, common yarrow, bull thistle (*Cirsium vulgare*), Kellogg's yampah (*Perideridia kelloggii*), California cudweed, gumweed (*Grindelia* spp.), hayfield tarweed, wild mustard, and wavyleaf soap plant.
- **Coyote brush-California sagebrush-toyon shrubland association.** This association occurs both on serpentine and non-serpentine soils generally on southeast- to southwest-facing slopes. The shrub layer can be more openly spaced or have denser coverage (30–80% on Coyote Ridge) and has an open herbaceous understory layer. Coyote brush is the dominant shrub, with toyon, California sagebrush, and bush monkey flower as associates. Other characteristic species are moss and California cudweed. Also frequently present are lichen, foxtail chess, and California figwort (*Scrophularia californica*). Black sage, deerweed (*Acmispon glaber* [*Lotus scoparius*]), and nit grass are less frequently encountered in this association.
- **Birchleaf mountain mahogany-chamise-bush monkey flower association.** This is a mixed shrub association with open cover (30% on Coyote Ridge). Birchleaf mountain mahogany, chamise, and bush monkey flower are dominants. The herbaceous layer is open and is composed primarily of Torrey's melic grass. An open hardwood layer may also be present. Other species that may be present in small numbers are hollyleaf cherry (*Prunus ilicifolia*), poison-oak, bedstraw (*Galium* spp.), sticky cinquefoil (*Drymocallis* [*Potentilla*] *glandulosa*), goldenback fern (*Pentagramma triangularis*), common yarrow, nit grass, purple sanicle (*Sanicula bipinnatifida*), foxtail chess, shiver grass, and Spanish broom (*Spartium junceum*).

Northern mixed chaparral/chamise chaparral occupies an estimated 23,763 acres (5.2%) of the study area (**Table 3-7** and **Figure 3-10**). This land cover type is found in the northeastern part of the study area in the Western Diablo and Diablo Ranges (**Figure 3-10**). It is also found in the central western portion of the study area. Northern mixed chaparral may intermingle with northern coastal scrub/Diablan sage scrub, foothill pine and oak woodlands, and mixed oak woodland and forest.

The covered plant that may be found on this land cover type is Loma Prieta hoita (*Hoita strobilina*), which grows in loose talus in chaparral (**Table 3-6**). Several wildlife species may be found in this land cover type as well. Given the presence of adjacent aquatic habitat, California tiger salamander, California red-legged frog and western pond turtle may use northern mixed chaparral/chamise chaparral as movement, avesiation, or foraging habitat (**Table 3-5**).

Mixed Serpentine Chaparral

Mixed serpentine chaparral consists of fire-adapted shrubs found on serpentine soils (California Partners in Flight 2004). Serpentine chaparral is generally more open than other chaparral types and shrubs tend to be shorter and have leaves which are reduced, curled, or thickened (Hanes 1988; California Partners in Flight 2004). Species present in mixed serpentine chaparral with a high affinity for serpentine are coyote ceanothus, Calistoga navarretia (*Navarretia heterodoxa*), Santa Clara Valley dudleya, Mt. Hamilton thistle, smooth lessingia, and Tiburon Indian paintbrush (*Castilleja affinis* ssp. *neglecta*).

Mixed serpentine chaparral in the study area includes the following associations based on quantitative vegetation sampling on Coyote Ridge (Evens and San 2004):

- **Bigberry manzanita/Torrey's melic grass shrubland association.** This association is found on serpentine soils with bigberry manzanita as the dominant shrub in an open shrub layer. Species that follow in dominance are Torrey's melic grass and soft brome. Other species that may be present in the understory are foxtail chess, small fescue, Italian ryegrass, slender wild oats, California sagebrush, and leather oak. Less frequently encountered species are purple needlegrass, toyon, rat-tail fescue, dwarf plantain, one-sided bluegrass, and ripgut brome.
- **Hollyleaf cherry-poison-oak/grass shrubland association.** The dominant shrub in this open serpentine shrub association is hollyleaf cherry. Coast live oak and valley oak (*Quercus lobata*) are often present in the overstory. Scrub oak and poison-oak are ubiquitous but in low cover. Other commonly associated shrubs with higher cover are bush monkey flower, bigberry manzanita, and California sagebrush. The most common species in the herbaceous layer, which is scattered to more frequent in coverage, include Italian ryegrass and soft brome. Foxtail chess, slender wild oats, wild mustard, Napa star thistle, phlox-leaved bedstraw (*Galium andrewsii*), Torrey's melic grass, ripgut brome, and common yarrow may also be present.
- **Leather oak-bigberry manzanita-chaparral silktassel/Torrey's melic grass shrubland.** This association occurs on north-facing rocky slopes on serpentine parent material. It has also been documented on talus deposits in the Mt. Hamilton Range. Leather oak is the dominant species in the shrub layer, which tends to be open to more continuously present (30–78% cover on Coyote Ridge). Bigberry manzanita and chaparral silktassel are also characteristic, with the former sometimes occurring as a co-dominant with leather oak. Other shrubs sporadically but frequently present are redberry buckthorn, poison-oak, toyon, hoary coffeeberry, hollyleaf cherry, and birchleaf mountain mohagany. The hardwood overstory tree layer may include scattered coast live oak.
- **Leather oak-bigberry manzanita-coast sagebrush/grass shrubland.** This serpentine shrubland association can be found on all aspects. Leather oak and bigberry manzanita are co-dominants in a shrub layer that is open to more continously present (12–45%). California sagebrush has the third greatest shrub coverage in the association. In the herb layer, Torrey's melic

grass, slender wild oat, and soft brome are characteristic species. Other grasses and herbs that may be present are Italian ryegrass, ripgut grass, foxtail chess, small-flowered needlegrass, poison-oak, California poppy, scrub oak, and hayfield tarweed. Santa Clara Valley dudleya may occur on rock outcrops within this association.

- **Leather oak-toyon-California bay shrubland association.** This association is found on north-facing slopes on serpentine parent material. The shrub layer is discontinuous to continuous and is dominated by leather oak. Poison-oak, bigberry manzanita, and toyon are subdominant but can be dominant in certain stands. This association is also characterized by an emergent layer of California bay. Additional characteristic shrubs are hoary coffeeberry, birchleaf mountain mahogany, bush monkey flower, California gooseberry (*Ribes californicum*), chaparral mallow (*Malacothamnus fasciculatus*), and blue elderberry (*Sambucus nigra* ssp. *caerulea* [*S. mexicana*]). Torrey's melic grass, soft brome, Italian ryegrass, and reddened clarkia (*Clarkia rubicunda*) are often present in low cover.
- **Hoary coffeeberry-Mt. Hamilton thistle-seep monkey flower shrubland.** This association occurs on northwest- and southwest-facing slopes in wetlands and seeps on serpentine soils. The shrub layer is open to more continuous with hoary coffeeberry as the dominant shrub. Italian ryegrass dominates a semi-continuous herbaceous layer but Mt. Hamilton thistle, seep monkey flower, hayfield tarweed, and common yarrow are also characteristic. Barley species (*Hordeum* spp.), bentgrass, irisleaf rush, and California poppy are frequently encountered as well.

Associations that occur both in serpentine and non-serpentine soils and are described above under *northern mixed chaparral/chamise chaparral* include

- **Chamise-bigberry manzanita-monkey flower shrubland association.**
- **Bigberry manzanita-mixed (California sagebrush-black sage) shrubland association.**
- **Coyote brush-California sagebrush-toyon shrubland association.** Coyote ceanothus is often present when this association occurs on serpentine soils.

Mixed serpentine chaparral occupies an estimated 3,712 acres (0.8%) of the study area (**Table 3-7** and **Figure 3-10**). Mixed serpentine chaparral is found east of U.S. 101 in the small canyons along Coyote Ridge and in small patches at higher elevations mostly in Henry W. Coe State Park. Small patches are also found on either side of Highway 152 near Pacheco Peak, in the upper Llagas Creek watershed, and in the vicinity of Anderson Reservoir and Dam. Mixed serpentine chaparral is most abundant (although never common) in the Santa Cruz Mountains south of Calero Reservoir and west of Morgan Hill.

Covered plants that may be found on this land cover type include, coyote ceanothus, Loma Prieta hoita, and most beautiful jewel-flower (**Table 3-6**). Several covered wildlife species may be found in this land cover type as well. Given the presence of adjacent aquatic habitat, California tiger salamander, California red-legged frog and western pond turtle may use mixed serpentine chaparral as movement, aestivation, or foraging habitat. Bay checkerspot butterfly uses mixed serpentine chaparral as movement habitat (**Table 3-5**).

Northern Coastal Scrub/Diablan Coastal Scrub

Northern coastal scrub/Diablan coastal scrub is composed primarily of evergreen shrubs with an herbaceous understory in openings. This land cover type is usually found at elevations below 300 feet (California Partners in Flight 2004).

On aerial photographs, Northern Coastal Scrub appeared a distinctive shade of pale turquoise-green in summer images and pale tan in fall and winter images; this land cover type typically occurs on south facing slopes, often in relatively small stands interspersed with annual grassland and oak woodland.

Northern coastal scrub/Diablan coastal scrub communities are dominated by California sagebrush and black sage, with associated species including coyote brush, California buckwheat (*Eriogonum fasciculatum*), poison-oak, and bush monkey flower (Holland 1986). Northern coastal scrub/Diablan coastal scrub occurs on both serpentine and non-serpentine substrate; however Northern coastal scrub that occurred on mapped serpentine soils was mapped as serpentine chaparral. The dominant woody plants in this land cover type are nearly the same among different soil types. Northern coastal scrub/Diablan coastal scrub in the study area includes the following vegetation associations based on quantitative vegetation sampling conducted on Coyote Ridge (Evens and San 2004).

- **California sagebrush-coyote ceanothus shrubland.** This association is found on serpentine and on the edges of serpentine on non-marine sedimentary substrate. California sagebrush and coyote ceanothus dominate the sparse shrub layer. Foothill pine is found in the sparse conifer tree layer. Toyon is also common. California yerba santa, Torrey's melic grass, bigberry manzanita, slender wild oats, coyote brush, small-flowered needlegrass, Napa star thistle, common yarrow, woolly-fruited lomatium, hoary coffeeberry, California bee-plant, blue elderberry, and lichen may be present in low amounts. Coyote ceanothus has a strong affinity for serpentine substrates.
- **California sagebrush/California poppy-grass shrubland**. This association is found on serpentine and on the edges of serpentine (on non-marine sedimentary substrate). California sage is the dominant shrub in a relatively open shrub layer (5–45% cover on Coyote Ridge). Slender wild oat, foxtail brome, California poppy, soft brome, and purple needlegrass are common associates. Common yarrow, Santa Clara Valley dudleya, nude buckwheat, Torrey's melic grass, Italian ryegrass, woolly-fruited lomatium, small-flowered needlegrass, Napa star thistle, and blue dicks may also be present.
- **California sagebrush-black sage shrubland.** This association, characterized by California sagebrush and black sage, is also found on serpentine and diabase. The shrub layer is relatively open (30–40% cover on Coyote Ridge) and the herbaceous layer is a minor component. Species

present include bigberry manzanita, coyote brush, toyon, foxtail brome, chaparral mallow, bush monkey flower, and coast live oak.

- **Black sage (pure) shrubland association.** This association occurs on serpentine on northwest- and southwest-facing slopes. Black sage forms a sparse to relatively dense cover of shrubs (average 54% cover on Coyote Ridge). California sage may be present at very low cover. The herbaceous layer is almost non-existent. Other species occasionally encountered are coast live oak, chamise, bigberry manzanita, blue elderberry, poison-oak, Napa star thistle, and scarlet pimpernel.

Northern coastal scrub/Diablan coastal scrub occupies an estimated 10,306 acres (2.2%) of the study area scattered throughout the Santa Cruz Mountains and Diablo Range (**Table 3-7** and **Figure 3-10**).

Covered plants that may be found on this land cover type fragrant fritillary, and most beautiful jewel-flower (**Table 3-6**). Several wildlife species may be found in this land cover type as well. Given the presence of adjacent aquatic habitat, California tiger salamander, California red-legged frog and western pond turtle may use northern coastal scrub/diablian coastal scrub as movement, upland, or foraging habitat (**Table 3-5**).

Coyote Brush Scrub

Coyote brush scrub is a type of northern coastal scrub dominated by coyote brush. Common associated shrub species in Santa Clara County include California sagebrush, California lilac (*Ceanothus* spp.), lupine species, bush monkey flower, hoary coffeeberry, and poison-oak. This land cover type is generally found on windy, exposed sites with shallow, rocky soils (Holland 1986); it also occurs on river terraces. Typically it represents the first stage (and least mature in terms of composition development) of scrub occupation of former grassland sites in the succession stage described above (Ford and Hayes 2007). Coyote brush scrub occupies an estimated 180 acres (0.04%) of the study area (**Table 3-7** and **Figure 3-10**). In the study area, it is found adjacent to a few riparian areas and on mid-slopes in the northeastern portion of the study area.

Several wildlife species may be found in this land cover type. Given the presence of adjacent aquatic habitat, California tiger salamander, California red-legged frog and western pond turtle may use northern mixed chaparral/chamise chaparral as movement, upland, or foraging habitat. Bay checkerspot butterfly uses this land cover as movement habitat (**Table 3-5**).

Ecosystem Functions

Function and Integrity

Northern coastal scrub/Diablan sage scrub and coyote brush scrub intermingle with California annual grassland, northern mixed chaparral/chamise chaparral, coastal prairie (grassland), and mixed evergreen forest (Ford and Hayes 2007) and serve as an important corridor for wildlife. In addition, small mammals tend to forage on grassland species that are close to shrub canopies because they afford greater protection (Keeley 2000). Because sage scrub species are less woody than chaparral species and tend to direct their energy to leaf growth, the structure of coastal scrub communities tends to be open with an herbaceous ground layer (California Partners in Flight 2004). This open structure is important to the white-crowned sparrow (*Zonotrichia leucophyrys nuttalli* and *Z. l. pugetensis*) and the sage sparrow (*Amphispiza bellii*). The Allen's hummingbird (*Selasphorus sasin*) and the orange-crowned warbler (*Vermivora celata lutescens*) are also associated with this land cover type. The leaves of sage scrub contain important nutrients for herbivorous insects, more so than northern mixed chaparral/chamise chaparral. Peak leaf nutrient levels in scrub appear to coincide with the height of bird breeding season and may be an important food source (California Partners in Flight 2004). California sage and black sage, members of both northern coastal scrub/Diablan sage scrub and northern mixed chaparral/chamise chaparral communities, are important food resources for small mammals, reptiles, and bird species. In addition, both communities have a relatively low proportion of nonnative species due to dense shrub canopies, soil types, and dry conditions, and thus are important resources to wildlife.

The fire-following forbs associated with northern mixed chaparral/chamise chaparral are abundant for one or more years after a fire and provide high-quality habitats for a diversity of insects and other wildlife. The unique flora of post-fire chaparral contributes to its trait of supporting the highest concentration of special-status plants of any community in California (California Native Plant Society 2001). Many species that inhabit chaparral also inhabit adjacent grassland and oak woodlands; however, some birds and mammals are found largely in the dense cover and shade of mature chaparral stands.

Natural Disturbance

Many of the plants in the chaparral and northern coastal scrub communities have evolved to be dependent on periodic fire for regeneration (Holland 1986; Hanes 1988; Schoenherr 1992). In fact, communities dominated entirely by chamise cannot sustain themselves in the absence of fire (U.S. Fish and Wildlife Service 2002). Some species of chaparral have peeling bark or volatile oils that promote fire (Schoenherr 1992). Many of the dominant shrubs, such as manzanita and ceanothus, have adapted to fire by resprouting from basal burls or woody root crowns following a fire event. Other species have seeds that require fire to initiate growth (U.S. Fish and Wildlife Service 2002; Rundel and Gustavson 2005). Regrowth is triggered by removal of the overstory, typically by fire. 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. Fire occurrence that is too frequent, however, can lead to the elimination of these communities altogether and promote annual grassland succession.

Ford and Hayes (2007) described the dynamic successional relationship between California grasslands and northern coastal scrub. Frequent fire, rodent herbivory, livestock grazing and trampling, and drought tend to maintain grassland and limit succession from grassland to northern coastal scrub as well as the succession from scrub to mixed oak woodland. The succession from grassland to scrub can be as rapid as >5% per year after suppression of fires and livestock grazing, and the succession from scrub to woodland can occur within 50 years after that.

Returning such sites to grassland would typically require management that included manual clearing and herbicides or repeated burning at times of maximum herbaceous understory and dry weather, followed by at least moderate intensity summer seasonal or year-long livestock grazing.

Threats

Threats to chaparral and northern coastal scrub include habitat fragmentation and loss due to urbanization, fire suppression, competition, and/or hybridization with nonnative plants, trampling, and natural events (U.S. Fish and Wildlife Service 2002).

Fire-suppression policies and growth of human habitation in chaparral and shrub communities pose a great threat to these communities. With buildup of fuel over many years, the risk of catastrophic fire is greatly increased (U.S. Fish and Wildlife Service 2002). Such a fire can kill threatened and endangered wildlife, which might otherwise be able to escape. Severe topsoil erosion is also a problem after these intense fires (Schoenherr 1992). Native serpentine chaparral is threatened by air pollution and resultant nitrogen deposition. Nitrogen enrichment fosters the invasion of nonnative species that replace native ones (Weiss 1999).

Oak Woodland

The most common land cover types in the study area are dominated by upland hardwood trees, usually various species of oaks (*Quercus* sp.). These land cover types were defined as part of the *oak woodland* natural community, an upland tree-dominated community with at least 10% cover of hardwood tree species. The oak-dominated land cover types that occur in the study area are listed below.

- Valley oak woodland.
- Mixed oak woodland and forest.
- Coast live oak woodland and forest.
- Blue oak woodland.
- Foothill pine-oak woodland.
- Mixed evergreen forest.

CDFG considers valley oak woodland and blue oak woodland sensitive biotic communities (California Department of Fish and Game 2007).

Historical Extent and Composition

Oak woodland land cover types were historically more extensive and less fragmented relative to current conditions. The deep alluvial soils found throughout the lowland areas of the Santa Clara Valley formerly supported a wide range of oak forests and woodlands. Historical photos, maps, and observational accounts indicate that large areas of the Santa Clara Valley within the Coyote Watershed were dominated by Valley oak woodland, all of which has been converted to urban development and agricultural uses (Grossinger et al. 2006).

Native Americans and European settlers manipulated local oak woodlands, through burning, grazing, and planting, to serve their needs. Large shifts in the composition and function of oak woodland communities began with the gold rush and increased in the latter part of the 20th century when previously grazed oak woodlands were converted to rural residential parcels leading to a decline in abundance and distribution of these oak communities (Pavlik et al. 1991). Recent studies show that the median parcel size in parts of California once dominated by oaks has decreased exponentially, from 550 acres in 1957 to just nine acres in 2001. As a result, the urban interface with oak woodlands is much more pervasive than at any other time in history (Giusti et al. 2004).

Common Wildlife Associations

Oak woodlands provide food and cover for many species of wildlife (County of Santa Clara 2005). Mature oak trees bear natural cavities, which are important resources for cavity-nesting birds and small mammals. Also, mature oak forests typically contain snags (standing dead trees), which are valuable resources for woodpeckers because they prefer dead trees and limbs for excavation of roost and nest sites (Thomas 1961). Snags receive high levels of use by secondary cavity-nesting birds (e.g., chickadees and wrens) and mammals. Snags also support wood-boring insects that provide food for bark-gleaning insectivorous birds. Oak forests also provide acorns, which as a seasonal food are important for the survival of many species of wildlife in fall and winter. Birds that are dependent on acorns as a seasonal food include acorn woodpeckers, scrub-jays, band-tailed pigeons, and California quail.

Characteristic wildlife species that can be found in these land cover types include amphibian species such as California red-legged frog and California tiger salamander that use these habitat types for summer aestivation and movement when aquatic habitats are present; reptile species such as gopher snake and western fence lizard; bird species such as red-tailed hawk, American kestrel, barn owl (*Tyto alba*), great horned owl (*Bubo virginianus*), acorn woodpecker (*Melanerpes formicivorus*), Nuttall’s woodpecker (*Picoides nuttallii*), northern flicker (*Colaptes auratus*), white-breasted nuthatch (*Sitta carolinensis*), California quail, spotted towhee (*Pipilo maculatus*), Bewick’s wren, and bushtit (*Psaltriparus minimus*); and mammal species such as deer mouse (*Peromyscus maniculatus*), western gray squirrel (*Sciurus griseus*), mule deer, and coyote (County of Santa Clara 2005).

Oak woodland-associated wildlife species covered by the Plan include Bay checkerspot butterfly, California tiger salamander, California red-legged frog, western pond turtle, tricolored blackbird, and San Joaquin kit fox (**Table 3-5**).

California tiger salamanders use the grassy understory of open woodlands for terrestrial aestivation or refuge and aquatic sites for breeding. The California red-legged frog uses this habitat type for breeding, foraging, and refugia. The western pond turtle utilizes aquatic habitat often found in oak woodlands. The turtle is known to overwinter in leaf litter or soil at upland sites. San Joaquin kit foxes may use this community for movement through the study area. The western burrowing owl uses open woodlands, with low-stature vegetation for foraging and burrowing. Bay checkerspot butterfly may use this community for movement between habitat patches.

Oak Woodland Land Cover Types

The six different oak woodland land cover types mapped showed quite different signatures on aerial photographs, in terms of color and texture, and each typically occupied different landscape positions.

Valley Oak Woodland

Valley oak woodland was distinguished by a combination of crown size and spacing and landscape position. In the Plan study area, valley oak tree crowns are typically larger than any other oak species except some blue oaks, and are typically well-spaced; valley oak woodland is almost always adjacent to annual grassland and either mixed oak or blue oak woodland types.

Although valley oak is typically found in alluvial soils in California, it also occurs in nonalluvial sites on broad ridgetops and mid-slope benches. *Valley oak woodland* is characterized by a fairly open canopy of mature valley oaks with a grassy understory, generally on valley bottoms and north-facing slopes (Griffin 1971; Holland 1986; Sawyer and Keeler-Wolf 1995). Valley oak woodlands often form a mosaic with annual grasslands, and are also found adjacent to other land cover types, including mixed oak woodland, blue oak woodland, and riparian woodland types. Valley oak woodland is generally denser on valley bottoms where the tree roots can penetrate to the groundwater, and less dense on ridges where trees need wider spacing to develop larger root systems (Griffin 1973).

Trees in the valley oak community are typically mature and well spaced. They are usually the only trees present in this open-canopy woodland, have no shrub layer, and the understory is dominated by nonnative annual grasses. As with most oak communities, regeneration typically is episodic, occurring periodically in “mast years” when acorn production is high and some acorns germinate by avoiding acorn predators such as acorn woodpeckers and California ground squirrels. Creeping wild rye, poison-oak, mugwort (*Artemisia douglasiana*), and California rose (*Rosa californica*) are common native species in riparian portions of valley oak woodland.

Covered plants that may be found within the valley oak woodland include Santa Clara Valley dudleya, fragrant fritillary, and Loma Prieta hoita (**Table 3-6**). These species are restricted to specific habitat elements and micro-site characteristics within this land cover. Valley oak woodland occupies approximately 12,895 acres (2.8%) of the study area (**Table 3-7** and **Figure 3-10**). This land cover type is most common on the valley floors of the southeast corner of the study area, but it also occurs on ridgetops in the central eastern portion of the study area.

Mixed Oak Woodland and Forest

The *mixed oak woodland and forest* land cover type is a significant land cover type in the study area. It contains oak woodland habitats where no species is clearly dominant, or where different types of oak woodlands are present in a small-scale mosaic and each type occurs in patches too small to map. It includes a mixture of live and deciduous oaks; foothill pine may be present as scattered individuals.

Mixed oak woodland and forest in the Plan study area is generally a closed-canopy woodland, with the signature on aerial photographs showing a variety of colors and textures of the different oak species; winter images clearly show that deciduous and evergreen oaks are mixed. This land cover type occurred on a variety of aspects and slope positions, and was typically adjacent to other oak woodland types.

Covered plants that may be found within mixed oak woodland and forest include Santa Clara Valley dudleya, fragrant fritillary, and Loma Prieta hoita (**Table 3-6**). These species are restricted to specific habitat elements and micro-site characteristics within this land cover. Mixed oak woodland and forest occupies approximately 84,488 acres, (18.4%) of the study area (**Table 3-7** and **Figure 3-10**). It is found predominantly at middle elevations in the foothills of the Diablo and Santa Cruz Mountains on either side of Santa Clara Valley. It is, taxonomically, the broadest and most geographically widespread of the oak woodland land cover types in the study area. It was mapped in most areas within the study area where oaks are found, with the exception of an eastern portion of the study area where foothill pine-oak woodland is dominant.

Coast Live Oak Woodland and Forest

The *coast live oak woodland and forest* land cover type mostly includes stands of coast live oak, although California bay is often a major component, and other live oaks and scattered deciduous trees are often present.

Coast live oak woodland and forest was identified by its closed canopy and even dark green color that was the same in all seasons, and by its landscape position, occurring generally on north-facing valley slopes and valley bottoms. There was often an abrupt transition between annual grassland and coast live oak woodland, with coast live oak woodland occupying valley slopes and annual grassland occurring on the surrounding ridges. Coast live oak woodland also occurred adjacent to other oak woodland types.

Grasses and herbs are common in this land cover type. Other species found in this cover type include coffeeberry, bush monkey flower, redberry buckthorn, and California sagebrush (Allen-Diaz et al. 1999). In addition, California blackberry (*Rubus ursinus*), bugle hedge nettle (*Stachys ajugoides*), wood fern (*Dryopteris arguta*), and poison-oak are often present.

Across the Central Coast Ranges, stands occur at lower elevations (200–3,250 feet, mean 1,205 feet) on north and northeast aspects. Slopes are generally steep (36% on average), and parent material is primarily sedimentary sandstone and shale, with loam soils (Allen-Diaz et al. 1999).

Covered plants that may be found within coast live oak forest and woodland include Santa Clara Valley dudleya, fragrant fritillary, and Loma Prieta hoita (**Table 3-6**). These species are restricted to specific habitat elements and micro-site characteristics within this land cover.

Coast live oak woodland and forest occupies approximately 31,652 acres of the study area (6.9%) of the study area (**Table 3-7** and **Figure 3-10**).

Blue Oak Woodland

Blue oak woodland is highly variable in the study area, occurring as single-species canopy stands with virtually no shrub layer understory or with a shrub layer of California sage, as open-canopy stands of widely spaced, mature trees on broad ridges, and as more mixed overstory stands with a dense and diverse shrub understory.

Blue oak woodland was identified by the color of the canopy: pale to mid green in summer imagery in contrast to coast live oak, and leafless in winter imagery. The canopy of blue oak woodland could be closed or relatively open. Aspect was important in distinguishing blue oaks from other deciduous oak species: blue oak woodland in the study area typically occurred on south-facing aspects; however, ridge-top stands of large, well-spaced blue oaks also occurred, and could be difficult to distinguish from valley oaks.

Blue oak woodland is dominated by blue oak (*Quercus douglasii*), a highly drought-tolerant species adapted to growth on thin soils in the dry foothills. Blue oaks grow slowly in these soils and may take decades to reach maturity. They generally occur on sites that are drier and have lower levels of nitrogen, phosphorus, and organic matter than those where valley oak or coast live oak are found (Griffin 1973; Baker et al. 1981). Although blue oaks can become established on south-facing slopes during wetter years or where mesic conditions are present, they are generally found on north-facing slopes (Griffin 1971). However, in the Central California Coast Ranges, blue oak woodland is more common on south-facing slopes (Miles and Goudey 1997). California buckeye and foothill pine are associate tree species in this community.

The understory varies from shrubby to open, with a composition similar to that of the adjacent nonnative grassland. Understory species include annual grasses, hollyleaf cherry, poison-oak, and coffeeberry. Blue oak woodland is considered a sensitive community by CDFG (California Department of Fish and Game 2007) when the following species are present: blue oak, valley oak, and coast live oak.

Fragrant fritillary is the only covered plant that may be found within blue oak woodlands (**Table 3-6**). This species is restricted to specific habitat elements and micro-site characteristics within this land cover.

Blue oak woodland and forest occupies approximately 11,160 acres (2.4%) of the study area (**Table 3-7** and **Figure 3-10**). It is present in scattered locations mostly in the low to mid-elevation hills of the watershed on dry or well-drained north or northeast facing slopes.

Foothill Pine-Oak Woodland

Foothill pine-oak woodland was identified by the obvious signatures on aerial photographs of well-spaced emergent foothill pine crowns, which appear pale gray-green with clear shadows over the lower canopy of contrasting darker green evergreen oaks. Foothill pine-oak woodland often occurred along valley floors within chaparral communities in the eastern foothills, and also occurred adjacent to other oak land cover types and on serpentine soils.

Found at elevations ranging from 200–2,100 feet, foothill pine integrates with blue oak and mixed oak woodlands at higher elevations, forming the *foothill pine-oak woodland* land cover type. Here, the canopy is dominated by emergent foothill pine with a typically dense understory of scattered shrubs, often those found in adjacent chaparral and scrub communities, and nonnative annual grasses and forbs. Oaks become more prevalent at lower elevations, often forming a closed canopy layer below the emergent pines, and the understory lacks an appreciable shrub layer. In the foothills to the east, associated canopy species include blue oak, interior live oak, coast live oak, and California buckeye (Griffin 1977). Closer to the coast, coast live oak, valley oak, blue oak, and California buckeye are typically found.

Associated shrub species include ceanothus species, bigberry manzanita, California coffeeberry, poison-oak, silver lupine (*Lupinus albifrons*), blue elderberry, California yerba santa, rock gooseberry (*Ribes quercetorum*), and California redbud (*Cercis occidentalis* [*C. orbiculata*]).

Covered plants that may be found within foothill pine-oak woodlands include fragrant fritillary and Loma Prieta hoita (**Table 3-6**). These species are restricted to specific habitat elements and micro-site characteristics within this land cover.

Foothill pine-oak woodland occupies approximately 10,960 acres (2.4%) of the study area (**Table 3-7** and **Figure 3-10**). It is found throughout the hills of the Diablo range in the eastern pocket of the study area, interspersed with stands of blue oak.

Mixed Evergreen Forest

Mixed evergreen forest was identified on aerial photographs primarily by its geographic location and aspect; it occurred on the west side of the valley usually on north-facing slopes. The closed canopy was dark green on imagery from any season, but appeared less even in texture than coast live oak woodland because of the mix of different tree species.

Dominant species in the *mixed evergreen forest* land cover type are evergreen broadleaved trees, such as California bay, madrone, tanoak (*Notholithocarpus* [*Lithocarpus*] *densiflorus*), and all three species of live oak: coast live oak, interior live oak (*Quercus wislizenii*), and canyon live oak (*Quercus chrysolepis*).

Conifers—Douglas fir (*Pseudotsuga menziesii*), Coulter pine (*Pinus coulteri*), and foothill pine—occur occasionally as scattered individuals. Deciduous species such as California buckeye and bigleaf maple (*Acer macrophyllum*) frequently occur in this land cover type. The transition between oak woodland and mixed evergreen forest land cover types in the study area is gradual and is characterized by a decrease in cover of live oaks and an increase in California bay, madrone, and tanoak.

Similar to the understory of oak woodlands, the understory of mixed evergreen forest varies from dense shrub thickets to areas dominated by sparse grass and forb cover. Water and light availability appear to be the controlling factors in determining the density of understory vegetation. Mixed evergreen forests lack drought adaptations and generally grow in more mesic habitats (Griffin 1971, 1973). North-facing slopes with well-drained, coarse soils provide ideal substrate conditions. The understory vegetation of mixed evergreen forests consists primarily of shade-tolerant species, such as toyon, poison-oak, and various species of ferns, due to low light levels underneath the canopy (Parker and Muller 1982; Marañón and Bartolome 1994).

Covered plants that may be found within mixed evergreen forest include Santa Clara Valley dudleya, fragrant fritillary, and Loma Prieta hoita (**Table 3-6**). These species are restricted to specific habitat elements and micro-site characteristics within this land cover.

Mixed evergreen forest occupies approximately 5,775 acres (1.3%) of the study area (**Table 3-7** and **Figure 3-10**). In the study area, it occurs on slopes with north and northeast aspects, almost exclusively at the western boundary of the study area, along high-elevation ridges in the Santa Cruz mountains.

Ecosystem Functions

Function and Integrity

Oak woodlands perform a variety of ecological functions, including nutrient cycling, water storage and transport, and wildlife habitat (Giusti et al. 2004). Oak woodlands share many of the same functions as the adjacent grassland and chaparral communities. However, the structure and food provided by the dominance of oak trees in this community distinguish it from the other natural community types. Oak woodland is one of the most biologically diverse communities in California, providing essential habitat for approximately 2,000 plant, 5,000 insect, 80 amphibian and reptile, 160 bird, and 80 mammal species (Merelender and Crawford 1998). Large acorn crops and a diverse insect fauna provide high-quality food for a wide variety of amphibians, reptiles, birds, and mammals.

Dense oak woodlands provide cool, shady refugia for wildlife during the hot, dry summer, and more sparse oak woodlands offer raptors ideal hunting perches. Open-canopy oak woodlands provide critical upland habitat for California tiger salamander, which aestivates in burrows in the grassland understory or beneath isolated oaks. These oak woodlands also provide nesting and foraging habitat for a variety of bird species. The grassland understory provides habitat for fossorial rodents such as ground squirrels and gophers, which are prey for red-tailed hawks, coyotes, and great horned owls. Rodent burrows, in turn, provide habitat for a variety of other species, including burrowing owls.

Natural Disturbance

Oak woodland is a fire-adapted ecosystem, and fire has likely played a large role in maintaining this community type in the study area. Fire creates the vegetation structure and composition typical of oak woodlands, and this natural community has experienced frequent, low-severity fires that maintain woodland or savannah conditions. In the absence of fire, the low or open understory that characterizes the land cover type is lost. Ultimately, closed-canopy oak forests are replaced by shade-tolerant species because oaks cannot regenerate and compete in a shaded understory. Soil drought may also play a role in maintaining open-tree canopy in dry woodland habitat.

Grazing, including precolonial grazing by deer and elk, may also have helped to maintain a more open understory that favors oaks and grasses.

Threats

The two main processes influencing the prevalence of oak woodlands in California are land conversion (for development and intensive agriculture) and the parcelization of large blocks of contiguous habitat for urban development (Giusti et al. 2004).

A lack of oak regeneration, which may be related to development pressures, is also a serious threat for some species. Shortages of apparent regeneration are reported for stands of valley oak, blue oak, and coast live oak. Where regeneration is a problem, mature trees and seedlings are usually adequately abundant, but intermediate-sized trees and saplings are rare or uncommon, suggesting the mature trees will not be replaced (McCreary 2009). Research on the causes of this decline has yet to identify a single causal mechanism. However, potential interacting mechanisms include livestock herbivory and trampling, fire suppression, noxious weed invasion, herbivory by small mammals, and the dominance of annual grasses (over native perennial grasses) that compete with the oak seedlings for soil moisture during the critical early spring period. McCreary (2009) provides a decision-key for determining whether a stand of oaks has a regeneration problem.

Recent research on the effects of wild pigs in California showed that they can disturb up to 35–65% of the ground annually where they occur in high densities, and that they significantly reduce acorn survival (Sweitzer and Van Vuren 2002). In addition to feral pigs, a high density of invasive weeds and nonnative plants in the understory affect oak regeneration. Some studies have found browsing by deer livestock, or other large mammals to be an important factor negatively impacting recruitment (Borchert et al. 1989; Bartolome et al. 2002). Another study found that herbivory by small mammals (Tyler et al. 2002) is very detrimental to oak recruitment. Recruitment in many tree species, particularly oaks, can be highly cyclical and dependent on long-term rainfall patterns.

A more recent influence on oak woodlands is sudden oak death. The disease, first identified in 1995, has since spread to 12 counties and killed tens of thousands of oaks. Research indicates that coast live oaks and black oaks appear to be the most susceptible to this disease (Rizzo et al. 2003). Sudden oak death, caused by the pathogen *Phytophthora ramorum*, is a serious threat to oak woodlands and mixed evergreen forests in northern California. The pathogen can kill adult oaks and madrone; California bay, buckeye, and maple host the pathogen without being killed by it. Blue oak and valley oak have not shown symptoms of the pathogen. Sudden oak death has been confirmed in San Mateo, Santa Cruz, Alameda, Contra Costa, and Santa Clara Counties. It is unknown whether climatic or other factors will limit the spread of sudden oak death into the study area.

Due to the rarity and slow regeneration of some species of oak, several oak-dominated land cover types are considered sensitive communities by CDFG (**Table 3-1**).

Additionally, when urban land is in close proximity to these land cover types, there is a considerable reduction in habitat value. Noise, light, irrigation, and frequent disking for fire protection can substantially degrade habitat conditions. Habitat is also threatened by invasion of exotic plant species in the understory.

Riparian Forest and Scrub

Riparian vegetation in the study area was classified into three land cover types.

- Willow riparian forests, woodlands, and scrub.
- Central California sycamore alluvial woodland.
- Mixed riparian woodland and forest.

CDFG considers central California sycamore alluvial woodland a sensitive biotic community (California Department of Fish and Game 2007).

Because stream systems are so closely tied to riparian forest and scrub land cover, the *riverine* land cover type is also discussed in this section.

Historical Extent and Composition

From the foothills to the valley floor, riparian forest, woodland, and scrub communities surround riverine watercourses, thriving along stream banks and floodplains. While the largest and most diverse riparian forests occurred on mainstem rivers with natural levees, well-developed riparian forest and scrub was found along virtually all watercourses in central California (Katibah 1984). Historically, riparian vegetation was shaped by its proximity to streams and was maintained by seasonal flooding in the winter and spring and by summer drought. Riparian forests developed on the natural levees of river-deposited silt, lining many of the study area's drainages. Virtually all streams supported dense vegetation from the water's edge to the outer moist-soil zone, whether or not natural levees were present. Precolonial riparian vegetation was characterized by corridors of dense, broadleaf vegetation of varying widths bounding the stream channel with widths determined by local geologic and hydrologic conditions (Katibah 1984).

With the gold rush in 1849, rapid development of some portions of California began. Riparian vegetation removal was one of the first significant losses in the natural environment. Although they are more fragmented today, these land cover types still support many plant species and a diverse collection of birds, amphibians, and mammals. Significant impacts have also resulted from the expansion of agriculture and livestock grazing, along with water diversion and flood control projects (Katibah 1984).

Historically, most of Coyote Creek along the valley floor may have been intermittent (often with isolated persistent pools) or dry during dry years and droughts while in wet years much of the stream may have been perennial. Streams draining the Diablo Range traveled overland, down the mountain slopes until reaching the valley floor where water spread out over the loose alluvial soils, percolating into the groundwater basin (Grossinger et al. 2006). Water traveled underground until reaching the main stem of Coyote Creek, where it surfaced and continued to drain through the salt marshes and into the San Francisco Bay. As land was claimed for agriculture, streams leading from the mountains were channelized into ditches to be used for drinking water and irrigation. The modern-day network of constructed drainage ditches and channels took place largely prior to 1900. Today nearly 50% of the valley floor watercourses draining into Coyote Creek are constructed channels (Grossinger et al. 2006).

The two main tributaries to the Guadalupe River, Guadalupe Creek and Los Gatos Creek, were historically connected to the Guadalupe River much as they are today. Much like the small tributaries of Coyote Creek, smaller tributaries of the Guadalupe River, such as Ross Creek, historically percolated into the valley floor but were not connected via surface flow to the Guadalupe River. Today, many of these small tributaries are now connected to the Guadalupe River via man-made channels (Oakland Museum of California n.d.). The Guadalupe River historically flowed into Guadalupe Slough but has since been redirected to Alviso Slough for navigation purposes.

As discussed above, the existing stream network was largely developed through human intervention and has been manipulated by the introduction of canals and ditches to provide additional flexibility in water supply, to increase the amount of developable land around streams, and to reduce flooding in the valley. As such, channels and ditches now cross between previously disparate riverine systems. One example of this is the Coyote-Alamitos Canal that was built to carry water from the Coyote Canal along Coyote Creek to Alamitos Creek and the Guadalupe percolation basin in the Almaden Valley (Horii 2004).

Historically, the defining feature of the Pajaro River watershed was a broad lowland basin that straddled the south Santa Clara County/north San Benito

County border. Covering 14 miles between Gilroy and Hollister, the remnants of this natural basin are now referred to as the Soap Lake floodplain. This historical basin was fed by the converging alluvial fans of Llagas Creek, Uvas/Carnadero Creek, and Pacheco Creek. As the streams left their steeper alluvial fans and converged into the basin, they tended to have less well defined channels than at present. Streamflow spread into an array of wet meadows, freshwater marshes and ponds, and willow swamps, and eventually coalesced again into a well-defined channel—the origin of the Pajaro River (San Francisco Estuary Institute 2007).

The head of the Pajaro River was originally wetlands associated with San Felipe Lake, a sag pond within the greater Soap Lake floodplain, located near Highway 152 east of Gilroy. When the Soap Lake floodplain was inundated, the lake and wetlands drained into the river. To facilitate agricultural development in the late 19th century, Miller Canal was constructed from San Felipe Lake directly to a downstream portion of the Pajaro River near its confluence with Llagas Creek, bypassing the flat, meandering wetland channel (San Francisco Estuary Institute 2007). The canal allowed for quicker spilling of the lake at a lower elevation, allowing farming around the lake. The original upper Pajaro River channel is now a shallow, seasonal ditch. Additional channelization of both Lower Llagas Creek and Cardanero (Uvas) Creek in the late 1800’s eliminated much of the historic seasonal flows received by the Soap Lake Basin.

Common Wildlife Associations

Riparian habitats provide food, water, migration and dispersal corridors, and nesting and cover habitat for numerous wildlife species (Grenfell 1988). These habitats have high value due to their limited extent and widespread use by an abundant and diverse assemblage of wildlife species.

Wildlife species that are often associated with this land cover type include amphibians such as Pacific tree frogs (*Pseudacris regilla*), California newts (*Taricha torosa*), and California slender salamander (*Batrachoseps attenuatus*); reptiles such as western aquatic garter snake (*Thamnophis couchii*) and San Francisco garter snake (*Thamnophis sirtalis tetrataenia*); birds such as Wilson’s warbler (*Wilsonia pusilla*), Swainson’s thrush (*Catharus ustulatus*), California yellow warbler (*Dendroica petechia brewsteri*), green heron (*Butorides striatus*), wood duck (*Aix sponsa*), spotted towhee, and red-shouldered hawk (*Buteo lineatus*); and mammals such as long-tailed weasel (*Mustela frenata*), San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), gray fox (*Urocyon cinereoargenteus*), mountain lion (*Puma concolor*), and California myotis (*Myotis californicus*).

Riverine systems, particularly healthy riverine systems, provide habitat for aquatic macroinvertebrates, which are an important food source for local and downstream populations of birds and other animals.

Bay checkerspot butterfly and California tiger salamander use riparian forest and scrub land cover as movement habitat. California red-legged frog uses riparian habitat type for breeding, foraging, and refugia. Foothill yellow-legged frog (*Rana boylii*) and western pond turtle utilize aquatic habitat for thermoregulation, foraging, and avoidance of predators. The turtle is also known to overwinter in leaf litter or soil at upland sites and uses sparsely-vegetated upland sites for nesting. Least Bell's vireo has been found foraging in riparian areas in the southern portion of the county and may be nesting, especially when a dense shrub layer exists, although no confirmed nests have been found. Tricolored blackbird uses this land cover type as breeding and year-round habitat. San Joaquin kit fox has been known to use this land cover as movement habitat.

Loma Prieta hoita is the only covered plant associated with riparian forest and scrub land cover types (**Table 3-6**).

Riverine associated wildlife species covered under this Plan that are known to occur in the study area include Bay checkerspot butterfly (for movement), California red-legged frog, foothill yellow-legged frog, western pond turtle, least Bell's vireo (*Vireo bellii pusillus*), tricolored blackbird, and San Joaquin kit fox (**Table 3-5**).

Riparian Forest and Scrub Land Cover Types

Within the Plan study area, riparian forest and scrub land cover types were identified primarily by their landscape position along creeks and around open water bodies. Several common riparian trees species—willows, cottonwood, and sycamore—appeared to hold their leaves after they turn color in fall, and early winter imagery clearly showed these distinctive yellow crowns, either in pure stands or mixed with the dark green canopies of coast live oak and bay in more mixed riparian woodland. The plant assemblage and width of riparian corridors found along the banks and floodplains of rivers and streams, vary. Dominant influencing factors include the steepness of the channel, the frequency of disturbance, and the hydrologic regime present.

The *riparian forest and scrub* land cover type is dominated by woody vegetation associated with permanent water sources. Riparian woodland is dominated by trees and contains an understory of shrubs and forbs. Riparian scrub is dominated by young willow trees and shrubs, typically representing an early successional stage of riparian woodland.

At the state level, riparian plant communities are considered sensitive because of habitat loss and their value to a diverse community of plant and wildlife species. Additionally, CDFG has identified them as a sensitive natural community (California Department of Fish and Game 2007).

Willow Riparian Forests, Woodlands, and Scrub

Willow riparian forests, woodlands, and scrub land cover types occur in and along the margins of active channels on intermittent and perennial streams. Yellow willow (*Salix lasiandra*), red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), and narrowleaf willow (*Salix exigua*) are the dominant canopy species in this habitat. In addition, Fremont cottonwood, white alder (*Alnus* *rhombifolia*), bigleaf maple, California sycamore (*Platanus racemosa*), and coast live oak are often found in these communities.

A range of conditions exists among the willow riparian forest, woodland, and scrub communities. Forests are typically composed of dense, mature willows integrating with central coast live oak riparian forest and white alder riparian forest on well-established stream terraces, often with scattered California sycamore trees. Woodland communities contain dense willow riparian scrub, dominated by young trees and shrubs, on young and dynamic alluvial deposits. Scrub communities typically consist of scattered willows and mulefat (*Baccharis salicifolia*) occurring in and along the margins of open sandy washes. Understory development in willow forest or scrub land cover types is controlled by canopy density.

Willow riparian forests, woodlands, and scrub occupy approximately 2,544 acres (0.6%) of the study area (**Table 3-7** and **Figure 3-10**). This land cover type is associated with streams throughout the study area. Particularly large stands of this land cover types are found along the major creek and streams including Guadalupe River, Coyote Creek, Uvas Creek, Llagas Creek, Pacheco Creek, and the Pajaro River along the county line.

Willow riparian forests, woodland, and scrub provide important habitat for many covered wildlife species (**Table 3-5**). For example, this land cover type provides the primary habitat for least Bell's vireo in the study area. California red-legged frog and western pond turtle will also utilize this land cover type within the aquatic systems. The California tiger salamander moves through or forages in this land cover type.

Central California Sycamore Alluvial Woodland

Central California sycamore alluvial woodland was readily identified by the large well-spaced sycamore crowns. In early winter aerial imagery the large pale branches and halo of fallen golden-yellow leaves were visible. The landscape position, on broad alluvial valley floors, was also indicative of this land cover type.

The *central California sycamore alluvial woodland* land cover type is generally present on broad floodplains and terraces along low gradient streams with deep alluvium. Areas mapped as sycamore alluvial woodland are generally open canopy woodlands dominated by California sycamore, often with white alder and willows (*Salix* spp.). Other associated species include bigleaf maple, valley oak, coast live oak, and California bay.

The understory is disturbed by winter flows, and herbaceous vegetation is typically sparse or patchy. Typically, plants such as willows, coyote brush, mulefat, California buckeye, blackberry, Italian thistle (*Carduus pycnocephalus*), poison-oak, common chickweed (*Stellaria media*) and bedstraw (*Galium aparine*) populate the stream banks.

Central California sycamore alluvial woodland occupies 367 acres (0.1%) of the study area (**Table 3-7** and **Figure 3-10**). All stands of this land cover type are found along Coyote Creek and Pacheco Creek. Air photos and field mapping conducted by CDFG of this land cover type in 1992 identified only 17 major stands statewide occurring on 2,032 acres (Keeler-Wolf et al. 1997). Among the stands mapped by this project were three sites in the study area on Coyote Creek (40.1 acres between Ogier Ponds and Anderson Dam), Upper Coyote Creek (49.2 acres above Coyote Reservoir), and on Pacheco Creek along Highway 152 (135.4 acres). At that time, the study area supported 11% of this land cover type in the state. All stands were also quantitatively sampled by CDFG, providing a basis for a detailed description of this land cover type in California. Results from the CDFG study differ from the mapping conducted for the HCP/NCCP (225 acres vs. 374 acres[16]). Sycamore woodland is also found along lower Cedar Creek (a tributary to Pacheco Creek) and the North Fork of Pacheco Creek upstream of Pacheco Reservoir.

California red-legged frog and western pond turtle may be found in this land cover type year-round, while California tiger salamander and foothill yellow-legged frog may move through this land cover type (**Table 3-5**). Least Bell's vireo may forage in this land cover type.

Mixed Riparian Woodland and Forest

Mixed riparian woodland and forest land cover types are similar to willow riparian forests and woodlands in species occurrences. They are found in and along the margins of the active channel on intermittent and perennial streams. Generally, no single species dominates the canopy, and composition varies with elevation, aspect, hydrology, and channel type. This land cover type captures much of the riparian woodland and forest in the study area and includes several associations that could not be distinguished on the aerial photographs. The major canopy species throughout the study area are California sycamore, valley oak, coast live oak, red willow, and California bay. Associated trees and shrubs include California black walnut, other species of willow, California buckeye, Fremont cottonwood, and bigleaf maple. Nonative invasive species that may be present include giant reed (*Arundo donax*) and Himalayan blackberry (*Rubus armeniacus* [*R. discolor*]).

Covered plants that may be found within mixed riparian forest and woodlands are limited to Loma Prieta hoita (**Table 3-6**). This species is restricted to specific habitat elements and micro-site characteristics within this land cover.

Mixed riparian woodland and forest occupies approximately 3,717 acres (0.7%) of the study area (**Tables 3-7** and **Figure 3-10**). Mixed riparian is found in association with streams throughout the study area.

Covered species associated with this land cover type are the same as willow riparian forests, woodlands, and scrub (**Table 3-5**).

[16] Differences in results are likely due to differences in mapping techniques, differences in air photos used, and changes in environmental conditions over the 13 years between the studies.

Riverine (Streams)

The *riverine* land cover type includes perennial, intermittent, and ephemeral watercourses characterized by a defined bed and bank. *Perennial streams* support flowing water year-round in normal rainfall years. These streams are often marked on USGS quadrangle maps with a blue line, known as *blue-line* streams. In the semi-arid Mediterranean climate of the study area with its wet and dry seasons, perennial stream flows are enhanced in the dry season through groundwater aquifer contributions, flows from shallower springs/seeps, and reservoir releases. *Intermittent (seasonal) streams* carry water though most of the wet season (November–April) and are dry through most or all of the dry season (May–October) in a normal rainfall year. More specifically, in the wet season, intermittent streamflow occurs when the water table is raised, or rejuvenated, following early season rains that fill shallow subsurface aquifers. Intermittent flows can also be considered as the 'baseflows' between storm events that continue on through much of the winter season. *Ephemeral streams* carry water only during or immediately following a rainfall event. The principal named waterways in the northern half of the study area (the Santa Clara Basin) are perennial due to urban runoff, reservoir releases, and/or high groundwater (Santa Clara Basin Watershed Management Initiative 2003). The principal waterways in the Pajaro River Basin have some perennial reaches due to a combination of high groundwater levels (primarily in headwater reaches of tributaries and in the Pajaro River), agricultural runoff, and releases from dams in the valley floor reaches.

The riverine land cover type is most closely associated with riparian plants (see the *Riparian Forest and Scrub* section above for discussion of riparian land cover types). The riparian plant composition and width of the riparian corridor vary depending on channel slope, magnitude and frequency of channel and overbank flows, and the frequency/duration of flooding flows that inundate the broader floodplain. Some of the riverine areas in the study area, particularly on the valley floor streams include braided stream forms with multiple channel threads and swales, intermediary channel bars, raised side channel benches (that are still actively flooded), and higher terrace sequences that may no longer be actively flooded. In such systems where there is frequent flooding, gravel bars with mulefat scrub occur as an early seral community (Santa Clara Basin Watershed Management Initiative 2003). Willows may become established in-channel in areas of sediment deposition, unless suppressed by intensive browsing by wildlife or livestock, lack of water, or high flows. Woody debris, such as fallen trees that are submerged in streams, provides good habitat and shelter for aquatic invertebrates.

Several invasive, nonnative plant species are found in riverine land covers within the study area. One of the most prevalent is giant reed, which is often found in large pure stands. Other invasive, nonnative plants potentially found in the study area include blue gum eucalyptus, acacia, fennel (*Foeniculum vulgare*), periwinkle, English ivy, French broom, black locust, Algerian ivy (*Hedera canariensis*), Cape ivy, Himalayan blackberry, weeds, curly dock (*Rumex crispus*), thistle, blackwood acacia (*Acacia melanoxylon*), tree-of-heaven (*Ailanthus altissima*), glossy privet (*Ligustrum lucidum*), fig, poison hemlock, black mustard, black walnut, and almond (Santa Clara Basin Watershed Management Initiative 2003).

Major streams in the study area include Coyote Creek, Guadalupe River, Uvas Creek, Llagas Creek, Pajaro River, Pacheco Creek, and their various tributaries (**Figure 3-6**). Riverine habitats were not mapped as polygons but are derived from USGS and SCVWD stream data. Based on this information there are an estimated 3,032.2 miles of riverine habitat in the study area.

Wildlife species covered by this Plan that may be found living in or nearby the riverine land cover type include California tiger salamander, California red-legged frog, foothill yellow-legged frog, and western pond turtle (**Table 3-5**).

Common fish species found in the watersheds draining towards San Francisco Bay (Guadalupe River and Coyote Creek) include native species such as California roach (*Lavinia symmetricus*), hitch (*L. exilicauda*), Sacramento sucker (*Catostomus occidentalis*), threespine stickleback (*Gasterosteus aculeatus*), resident rainbow trout and anadromous steelhead (*Oncorhynchus mykiss*), prickly sculpin (*Cottus asper*), and riffle sculpin (*Cottus gulosus*), and introduced fishes such as green sunfish (*Lepomis cyanellus*), largemouth bass (*Micropterus salmoides*), and mosquitofish (*Gambusia affinis*). Common native fish species found in the Pajaro River Watershed including Uvas, Llagas, and Pacheco Creek, include resident rainbow trout and anadromous steelhead, hitch (*Lavinia exilicauda*), California roach (*Lavinia symmetricus*), Sacramento blackfish (*Orthodon microlepidotus*), Sacramento sucker, threespine stickleback, Sacramento pikeminnow (*Ptychocheilus grandis*), riffle sculpin and prickly sculpin (J. Smith pers. comm. 2007).

Native and nonnative fish assemblages and in-stream aquatic habitat types throughout the major stream systems in the study area are shown in **Figure 3-12** and described in detail in **Appendix L**. The figure illustrates the distribution of the native fish assemblages and riverine habitat types developed for the Science Advisors report (Spencer et al. 2006) and updated by SCVWD fisheries biologist Jae Abel for the GIS layer. **Table 3-8** documents the relationship of the native fish communities to native fish.

Canals and ditches were included in the riverine land cover type due to their similar function to degraded streams and their very low acreage in the study area. Due to the nature of these man-made structures, canals and ditches are often managed for minimal vegetation to enhance the flow of water through the channels. Vegetated canals and ditches that cross serpentine areas (e.g., Coyote Ridge, Santa Teresa Hills) often support several covered species including Santa Clara Valley dudleya, most beautiful jewelflower, smooth lessingia, Mt. Hamilton thistle, and California red-legged frog. Garter snakes and some ducks use canals and ditches throughout the study area.

Ecosystem Functions

Function and Integrity

While riparian land cover types occupy a very small percentage of the total land cover in the study area, they are particularly important because they are among the most structurally complex and richly diverse habitat types in terms of plant and animal associations.

Riparian communities support both terrestrial and aquatic species by providing movement corridors across the landscape and both nesting and foraging habitat. They can also support high levels of invertebrate production; provide moist, cool refugia during the hot, dry summer; have moderate stream temperatures; help armor stream banks; and support the aquatic food chain by means of input of vegetative and other detritus.

Riparian areas are integrated into the working rangelands of the study area. They are typically managed in conjunction with adjacent grasslands, shrublands, and oak woodlands. They are often used by livestock for forage, shade and drinking water.

Denser canopies reduce direct solar radiation to streams and creeks, thereby lowering water temperatures and may increase habitat value for aquatic wildlife. However, algal growth, which increases aquatic insects, requires a partially open canopy for light. Differences in vegetative structure between riparian communities lead to varying effectiveness in providing these ecosystem functions. For example, riparian scrub, with its lower vegetation structure, is often less effective in reducing stream temperatures than riparian woodland. On the other hand, riparian scrub may provide better nesting and foraging habitat for migratory passerine birds that prefer the dense thicket habitat provided by scrub. Living and dead woody debris that enter the stream channel from the riparian forest provides valuable habitat benefits for native fish.

Physically, riverine systems, most notably natural streams, provide the essential conduits to convey flows, sediments, and nutrients across the watershed. Streams transport weathered minerals and eroded sediments from upper watershed source areas through intermediate watershed positions ultimately to lower watershed depositional areas or discharges beyond the watershed. While the general, and classical, characterization of watersheds into ‘upper erosional’, ‘middle transitional’, and ‘lower depositional’ areas may often hold true; in greater detail, all areas of the watershed can witness erosion, transport, or storage functions. Nutrients from exposed soil and decomposed organic matter are also carried downstream with the sediment, across the valley floor and finally into the estuary. Alluvial soils, high in organic content and nutrients, are excellent for agriculture. Sediment influx to estuaries helps maintain a marshland buffer along the shoreline that supports a myriad of wildlife.

Streams provide ecosystem functions and values much greater than the proportion of the landscape they occupy. Streams provide habitat for a wide array of aquatic insects that, in turn, function as food for amphibians, birds, and other insectivorous species. Perennial streams function as permanent water sources in an otherwise dry landscape. Streams also provide movement corridors between different terrestrial communities. In this way, networks of ephemeral, seasonal, and perennial streams link chaparral/scrub, oak woodland, oak savanna, riparian woodland, and grassland habitats. These links are not only important for the movement of wildlife, but also represent the fastest means of transporting energy and nutrients through a watershed. Thus, it is through stream networks that organic matter and minerals are transported from the highlands and deposited in the lowlands.

Stream channels are modified for a variety of purposes. In the study area, stream channels are modified primarily for flood conveyance, ground water percolation, and agricultural and drinking water distribution. Canals and ditches are usually hardened structures for the transport of water for agricultural irrigation and urban and suburban uses. Earthen levees or channel walls are a common, engineered stream channel modification to protect property adjacent to streams from flooding. Most stream channel alterations, whether hardened structures like canals, or earthen structures such as some ditches and levees, are designed to convey water quickly, to either reduce evapotranspiration (water lost to the atmosphere) during transport, costs associated with water delivery, or to increase the flow, and thus the volume of runoff, that can be moved out of areas prone to flooding. Regardless of the type of modification, the result is often the same—a more linear alignment that does not allow a channel to meander as it would in its natural state. This results in higher flows and potential scour of the stream channel, in hardened structures such as canals, this scour typically occurs upstream and/or downstream of the solid infrastructure. Channel modifications and/or solid infrastructure such as canals also disconnect the stream from the floodplain, resulting in the loss of nutrient delivery upstream and increased sediment deposition downstream.

Agricultural ditches often play a key role in providing connectivity between larger open space areas, especially in urbanizing areas such as the Santa Clara Valley. Maintaining connectivity between open space patches that provide habitat supports a diversified genetic pool due to the ability of populations to disperse and co-mingle. Agriculture also often is associated with streams, canals, and ditches used for irrigation that may support riparian vegetation, trees (planted as windbreaks), and shrubs. These areas may provide habitat to songbirds, raptors, amphibians and reptiles, as well as provide a movement corridor for other species.

Natural Disturbance

Riparian communities are shaped by their proximity to water and by periodic flooding that maintains the structure and composition of this land cover type. Wet-season flooding replenishes alluvial soils that are deficient in minerals and organic matter. Flooding also subjects riparian forest to frequent disturbance that benefits regeneration of certain species, including California sycamore, white alder, and black willow. Regeneration from seed appears to occur in pulses correlated with large flood events (Shanfield 1984). Additionally, trees that are damaged by flooding can resprout from the roots and trunk (Shanfield 1984).

The flowing nature of streams encourages regular mixing as water flows over rocks, tree stumps, and changes gradient. Depending on other environmental influences including temperature and dissolved oxygen levels, mixing may also trigger the hatching of larvae that will become food for fish, birds, and bats. Erosion and sedimentation processes are forms of natural and artificial disturbance in the area. Flood and drought cycles of natural streams tend to result in a mosaic of structure and composition in riparian plant communities (this mosaic may be lost in altered flow regimes downstream of reservoirs). Flooding is also a key disturbance process that has largely been eliminated from portions of the study area. For example, large flood-control projects on the Guadalupe River and Coyote Creeks have greatly reduced flooding frequency and intensity. Similarly, channelization of Llagas Creek and portions of Uvas Creek has reduced (but not eliminated) flooding in Morgan Hill and Gilroy, respectively. Flooding still occurs regularly in the Soap Lake area (lower Llagas Creek, lower Pacheco Creek, and upper Pajaro River).

Threats

In the greater Bay Area, flood control activities, cultivated agriculture, aggregate mining, and urban development have significantly reduced the distribution of this land cover type. Riparian forest can also be severely impacted by improper grazing management. Therefore it is possible that this cover type was much more abundant prior to the onset of intensive livestock grazing. Finally, seedling establishment and growth is heavily dependent on access to surface water or shallow groundwater during the majority of the year (Sacchi and Price 1992). As such, water operations and land alterations that result in reduced stream baseflows and/or increased depth to the water table will have a significant negative effect on this land cover type. Sycamores in the study area, including those that dominate Sycamore alluvial woodland, are frequently infected by Sycamore anthracnose (*Apiognomonia veneta*), a fungal disease that affects trees throughout the state (Keeler-Wolf et al. 1997).

Livestock grazing can substantially degrade riparian woodland and scrub communities when cattle and other livestock have uncontrolled access to streams. However, modifying traditional grazing practices can protect riparian areas. Using shortened grazing periods during times of increased vulnerability (late summer and fall) can reduce damage to the vegetation, eliminate or reduce impacts to soils, and buffer the overland transport of sediments and nutrients from grazed lands into the surface water.

All riverine systems within the study area have been altered significantly by human impacts including impoundments, creation of permanent or temporary barriers to movement, water diversions, channelization, flood control projects, loss of riparian vegetation, and increased rates of sedimentation. These impacts reduce habitat complexity and habitat quality, affecting such things as pool/riffle relationships, level of dissolved oxygen, and substrate composition. Loss of riparian vegetation results in decreased shading, increased water temperatures, reduced cover, and decreased input of nutrients (Santa Clara Basin Watershed Management Initiative 2003). Trash and other pollutants that are washed into streams may degrade water quality to the point the aquatic life cannot persist.

Aquatic invertebrates, often sensitive to water quality, may die off, thus disrupting the food chain.

Conifer Woodland

In addition to hardwood-dominated upland land cover types, conifer dominated land cover types also occur in the study area. The three conifer-dominated communities listed below occur in the study area.

- Redwood forest.
- Ponderosa pine woodland.
- Knobcone pine woodland.

Historical Extent and Composition

Prior to European settlement, the Santa Clara Valley supported a mosaic of plant and wildlife communities. Upland regions were heavily forested with redwoods that flanked creeks and rivers as they traversed the landscape to lower elevations. Under mesic habitat conditions, pine and oak forests dotted the land (Bolton 1927, 1930). The foothill forests and woodlands were heavily thinned in the mid- to late-1800s to house and support the growing population in the region. With habitat alterations came the replacement of native plant communities with nonnative, invasive species. These new communities contain lower quality habitat for native wildlife species.

Common Wildlife Associations

Wildlife species often found in conifer dominated upland land cover types include: birds such as acorn woodpecker, scrub-jay (*Aphelocoma californica*), California quail, golden eagle, Cooper's hawk (*Accipiter cooperii*), olive-sided flycatcher (*Contopus cooperi*), and sharp-shinned hawk (*Accipiter striatus*); amphibians such as arboreal salamanders (*Aneides* spp.), California slender salamander, and California newt; reptiles such as common king snake (*Lampropeltis getula*), garter snake (*Thamnophis* spp.), and ringneck snake (*Diadophis* spp.); and mammals such as broad-footed mole (*Scapanus latimanus*), deer mouse, western gray squirrel, gray fox, and striped skunk (*Mephitis mephitis*).

Associated wildlife species covered under this Plan that are known to occur in the study area include California tiger salamander, foothill yellow-legged frog and western pond turtle (**Table 3-5**).

California tiger salamanders use the grassy understory of open woodlands for terrestrial aestivation or refuge and aquatic sites for breeding. Foothill yellow-legged frogs and western pond turtles utilize aquatic habitat often found in redwood forest and oak woodlands. The turtle is also known to overwinter in leaf litter or soil at upland sites.

Conifer Woodland Land Cover Types

Coast redwood (*Sequoia sempervirens*) forests are primarily distributed in the Santa Cruz Mountains. They occur in ravines, along streamsides, and in areas that are moistened by coastal fog (Thomas 1961). At higher elevations of the Diablo Range, stands of ponderosa pine (*Pinus ponderosa*) are found. Stands of knobcone pine (*Pinus attenuata*) occur on ridgetops of the Santa Cruz Mountains at the western edge of the study area.

Redwood Forest

Redwood forest was identified on aerial imagery by the large, irregular crown outlines formed by the whorled branches, and by the landscape position along creeks and valleys and on lower north- and east-facing slopes in the foothills on the western side of the valley. The irregular crown signatures on aerial photographs contrasted with the adjacent land cover types, usually mixed oak woodland or mixed evergreen woodland.

The *redwood forest* land cover type is dominated by an overstory of redwood with a variety of associated tree, shrub, and forb species in the understory. This land cover type is uncommon in the study area, only occurring in the Santa Cruz Mountains in the west portion of the study area along creeks and valleys, generally on north-facing slopes. Stands of redwoods are found along Uvas (Uvas Canyon County Park), Llagas, and Arthur Creeks. Most redwood forests have been logged since the second half of the nineteenth century, and most of the existing trees are stump sprouts. However, in many areas, particularly along creeks, dense cover of redwood trees has been maintained. Areas that were burnt following logging now support chaparral or oak-dominated communities. Redwood forests occur in areas that receive substantial rainfall, generally more than 35 inches per year. Common plants associated with these forests include trees such as tanoak, madrone, and California bay; the shrub layer include species such as hazelnut (*Corylus cornuta* var. *californica*), thimbleberry (*Rubus parviflorus*), and black huckleberry (*Vaccinium ovatum*). In riparian areas, California bay and bigleaf maple are common, California nutmeg (*Torreya californica*) may occur, and ferns such as sword fern (*Polystichum munitum*) often form a dense layer.

Redwood forest occupies approximately 9,628 acres (1.9%) of the study area (**Table 3-7** and **Figure 3-10**). This land cover type is found in the study area exclusively in the Santa Cruz Mountains, mostly along drainages and near ridgelines.

Covered wildlife species that may be found in this land cover type California red-legged frog, foothill yellow-legged frog, and western pond turtle (**Table 3-5**).

Fragrant fritillary and Loma Prieta hoita may occur within redwood forest landcover, however, data is insufficient for the study area (**Table 3-6**). These species would be restricted to specific habitat elements and micro-site characteristics within this land cover.

Ponderosa Pine Woodland

Ponderosa pine woodland has a very restricted distribution within the Plan study area and was identified by the widely-scattered dark green crowns of individual Ponderosa pine trees, which cast long oblong shadows across the adjacent grassland.

The *Ponderosa pine woodland* type is dominated by an overstory of ponderosa pine, with oaks and oak woodland understory species as associates. This land cover type is uncommon in the study area, only occurring on three high elevation ridges in Henry W. Coe State Park—Pine Ridge, Middle Ridge, and Blue Ridge—and extending downslope into north-facing canyons and valleys. On the ridges, Ponderosa pine trees are often large and well spaced, forming very open stands over annual grassland. Regeneration is often common and many age classes are present. Associated tree species include black oak (*Quercus kelloggii*), coast live oak, and Pacific madrone. Few shrubs are present, although bigberry manzanita is common in some areas. Ponderosa pine is uncommon in the Coast Ranges; these stands are likely relicts of a wider distribution in the past when the climate was cooler.

Ponderosa pine woodland occupies approximately 419 acres (0.1%) of the study area (**Table 3-7** and **Figure 3-10**).

California tiger salamander, California red-legged frog and western pond turtle may move through this land cover type during dispersal events (**Table 3-5**).

Loma Prieta hoita may occur within ponderosa pine woodlands, however, data is insufficient for the study area (**Table 3-6**). This species would be restricted to specific habitat elements and micro-site characteristics within this land cover.

Knobcone Pine Woodland

Knobcone pine woodland was identified by its geographical location on ridges in the western portion of the Plan study area and the mid-green, relatively even signature on aerial photographs contrasting with adjacent signatures of redwood forest, northern mixed chaparral, and mixed evergreen forest.

Knobcone pine woodland land cover types consist of dense stands of knobcone pines that regenerate following fire. This land cover type is uncommon in the study area, occurring only in the Santa Cruz Mountains on ridgetop sites, often on serpentine-derived soils. It is thought that the water-retaining properties of serpentinite, combined with the pine’s ability to intercept marine fog, allow knobcone pine to persist in these locations (Vogl 1973). Knobcone pine is an obligate fire-climax species—fire is required to melt the resin that seals the cones, releasing the seed, and fire also creates the bare mineral soil required for the seeds to germinate. Stands of knobcone pine are therefore even-aged, dating back to the last stand-replacing fire. Knobcone pine is fast growing, with a relatively short lifespan of 75 to 100 years, although approximately half the trees may die by 60 years of age (Vogl 1973). Knobcone pine woodland is replaced by chaparral at lower elevations and by conifers (redwood or Douglas fir) at higher elevations, and it may occur as a mosaic with chaparral, conifer- and oak-dominated woodlands. Although knobcone pine usually occurs as dense, monodominant stands, it can also be associated with chaparral species such as manzanitas, bush poppy (*Dendromecon rigida*), and bush chinquapin (*Chrysolepis chrysophylla* var. *minor*) that form a sparse to dense understory layer.

Knobcone pine woodland occupies an estimated 711 acres (0.1%) of the study area (**Table 3-7** and **Figure 3-10**). This land cover type is found along the summit of the Santa Cruz mountains at the western edge of the study area.

Covered species do not forage and breed in this land cover type. Species that may move through this land cover type include California red-legged frog and western pond turtle (**Table 3-5)**.

Fragrant fritillary and Loma Prieta hoita may occur within land cover type; however, data is insufficient for the study area (**Table 3-6**). These species would be restricted to specific habitat elements and micro-site characteristics within this land cover.

Ecosystem Functions

Function and Integrity

Similar to oak woodland, these forests and woodlands provide food, nesting, and cover to a variety of wildlife. However, the structure and food resources that conifer-dominated forests provide make them a valuable resource. Evergreen oaks such as coast live oak, as well as California bay, madrone, and foothill pine, provide year round shelter unlike the largely deciduous vegetation of riparian forest and scrub. A largely continuous, dense leaf canopy and abundant tree cavities act to shade wildlife, provide habitat for nesting, and offer protection from predators. In addition, thick layers of leaf litter, ephemeral ponds, and wetlands can provide secondary habitat for soil invertebrates and amphibians by offering protection from desiccation and foraging habitat.

Natural Disturbance

A major factor influencing the distribution of conifer-dominated land cover types is fire intensity and frequency. The combination of logging and burning at the end of the nineteenth century resulted in the conversion of conifer-dominated forests (redwood and Douglas fir) in the Santa Cruz Mountains to chaparral and oak-dominated woodlands. Periodic stand-replacing fire is required for the regeneration of knobcone pine woodland.

Threats

Conifer-dominated land cover types have been heavily affected by timber harvesting, urban development, and agricultural conversion. When urban land is adjacent to or surrounds these natural communities, there is a significant reduction in habitat value. Noise, light, irrigation, and frequent disking for fire protection can substantially degrade habitat conditions and the chance of fire increases. Habitat is also threatened by invasion of exotic plant species in the understory.

Wetlands

Wetland habitat includes areas subject to seasonal or perennial flooding or ponding, or that possess saturated soil conditions and that support predominantly hydrophytic or “water-loving” herbaceous plant species. Because wetlands are periodically waterlogged, the plants growing in them must be able to tolerate low levels of soil oxygen associated with waterlogged or hydric soils. The presence of flood-tolerant species is often a good indication that a site is a wetland even if the ground appears to be dry for most of the year (Barbour et al. 1993; Santa Clara Valley Water District 2002a), or if hydrologic influences are less obvious.

Wetland habitat in the study area was classified into two land cover types.

- Coastal and valley freshwater marsh.
- Seasonal wetland.

In general, wetlands represent a sensitive biotic community due to their limited distribution and importance to special-status plant and wildlife species.

Historical Extent and Composition

Wetland habitats, in particular seasonal wetlands, were almost certainly more abundant in the study area than they are today. Historically, vernal pools and other seasonal wetlands and ponds were likely scattered throughout the lowland portions of the study area and streams flowed unimpeded by the channels, water diversions, and barriers that are present today. At the time of the Portola expedition in 1769, large marshes, especially near the lower portions of Coyote Creek and the Guadalupe River, reportedly made overland travel by foot very difficult (Santa Clara Basin Watershed Management Initiative 2003).

Two large freshwater wetland areas, Laguna Socayre and Laguna Seca, were located within the Coyote Watershed prior to reclamation activities. These lagunas were a type of perennial emergent freshwater wetland that has groundwater at or near the surface through most, if not all of the year. Laguna Socayre, located east of downtown San José, above and below Capitol Expressway between Story and Tully Road, was a series of historic freshwater wetlands, which included a large freshwater marsh which partly overlaps with modern-day Lake Cunningham (Grossinger et al. 2006). It was created by an old levee of Coyote Creek and intercepted flood flows from the surrounding distributary creeks and may have received emergent groundwater as well. Laguna Seca in Coyote Valley, was an approximately 1,000-acre spring-fed perennial wetland complex formed as the Santa Teresa Hills forced groundwater to the surface. Drainage was blocked by the bedrock of the Santa Teresa Hills and the natural levees of Coyote Creek (Grossinger et al. 2006). In certain years during the dry season, Laguna Seca would dry up completely. It was reclaimed from 1916–1917.

In the low-lying bottomlands, poorly drained basin areas between alluvial fans, flooded wet meadows or marshes sometimes were formed around smaller perennial freshwater marshes and lagunas. In addition, the heavy organic clay soils characteristic of the bottomland areas, often referred to as “black adobe” soils resulted in surface expression of groundwater in seasonally flooded wet meadows and perennial wetland complexes (Grossinger et al. 2006). In addition, bedrock hills prevented drainage of the lower Coyote Valley, which created vast wet meadows with perennial marshes and ponds. The natural levees of Coyote Creek and flat topography also prevented surface runoff and helped created these wet meadows. The dominant plant species in wet meadows or marshes were probably rhizomatous ryegrasses (*Elymus* spp.) (Grossinger et al. 2006). Large stands of saltgrass and alkali meadow were also extensive in the Coyote Watershed, particularly in the lowlands near lower Penitencia Creek and downgradient from Laguna Socayre (Grossinger et al. 2006). Remnant stands of alkali meadows are still present around the fringes of Lake Cunningham in San José. Historic patterns of wetlands in the Guadalupe Watershed are likely to be similar to those in the Coyote Creek Watershed. In the Uvas/Llagas/Pacheco/Pajaro watersheds seasonal or perennial wetlands were present near the mouths of Uvas and Llagas creeks, and the Soap Lake wetland complex of wetlands, vernal pools and alkali meadows was much more extensive than at present in the upper Pajaro River/lower Pacheco Creek area (San Francisco Estuary Institute 2008).

In a statewide study of vernal pools, CDFG identified large portions of Santa Clara County as potentially supporting vernal pools based on the presence of vernal pool species[17] (California Department of Fish and Game 1998). Vernal pools recognized in Santa Clara County are fault-zone sag-pond pools and serpentine vernal pools (California Department of Fish and Game 1998; Santa Clara Basin Watershed Management Initiative 2003). A vernal pool just north of the study area in southern Alviso is known to have existed prior to urban development in the area (Sally Casey pers. comm. 1998 in Santa Clara Basin Watershed Management Initiative 2003). Detailed investigations of historic records of wetlands and other land cover types in the Coyote Creek Watershed revealed no evidence of historic vernal pools (R. Grossinger pers. comm.). Vernal pools may have always been rare in the study area.

European settlement saw the introduction of nonnative aquatic species such as the bullfrog, into wetland habitats. Those areas whose hydrology has been altered by damming (e.g., stock ponds) or channelization have been particularly impacted.

[17] Vernal pools in most other regions were identified based on the unique signature on air photos of vernal pool landscapes and wetland complexes.

Common Wildlife Associations

Wetland land cover types provide drinking water, as well as foraging, breeding, and resting habitat for many forms of fish and wildlife, including birds, amphibians, reptiles and mammals. Wetlands provide stopovers for many species of waterfowl and songbirds. Many wildlife species, particularly invertebrates, spend their entire lives in wetlands.

Perennial wetlands are important habitat for a wide variety of wildlife species. Representative waterbirds that forage and rest in permanent wetlands and associated open-water areas include great blue heron (*Ardea herodias*) and great egret (*Ardea alba*); as well as various ducks, including wood duck, green-winged teal (*Anas crecca*), mallard (*Anas platyrhynchos*) and American coot (*Fulica americana*); killdeer (*Charadrius vociferus*); and greater yellowlegs (*Tringa melanoleuca*). Typical amphibians and reptiles in this cover type include red-legged frog, western pond turtle, and garter snakes. Many of the larger mammals, such as mule deer, may frequent permanent wetlands and use them as a source of drinking water.

Seasonal wetlands (i.e., wet meadows, seeps) are commonly used by a variety of wildlife during the wet season, including various amphibians such as Pacific chorus frog (*Pseudacris regilla*), western toad (*Bufo boreas*), and California tiger salamander; shorebirds such as killdeer, black-necked stilt (*Himantopus mexicanus*), and American avocet (*Recurvirostra americana*); and passerines such as Brewer's blackbird (*Euphagus cyanocephalus*), red-winged blackbird (*Agelaius phoeniceus*), brown-headed cowbird (*Molothrus ater*), and American pipit (*Anthus rubescens*). During the dry season, a variety of small mammals may use seasonal wetland areas as forage source, including deer mouse, California vole, and long-tailed weasel; however, wet meadows and seeps are generally too wet to provide suitable habitat for small mammals. Raptors such as white-tailed kites, northern harrier, and red-tailed hawk may forage in this land cover type.

Wetland-associated wildlife species covered under this Plan include bay checkerspot butterfly, California tiger salamander,California red-legged frog, western pond turtle, western burrowing owl, tricolored blackbird (*Agelaius tricolor*), and San Joaquin kit fox (**Table 3-5**).

Wetland Land Cover Types

Within the study area, wetlands were identified and mapped on the basis of their aerial photograph signatures and landscape positions that would support wetland hydrology. In late season imagery, wetlands appear greener than surrounding annual grassland. The minimum mapping unit for all wetland land cover types was 0.25 acre, with the exception of serpentine seeps (see *Grasslands*), which had no minimum mapping unit. Wetland subtypes were distinguished based on the color and texture of the signature on air photos.

On early spring imagery, coastal and valley freshwater marsh appeared pale brown and rough in texture because the emergent plants (cattails and bulrushes) have died back and have not yet started to grow. In contrast, at this time of year, seasonal wetlands appeared dark green, but are difficult to distinguish from the surrounding annual grassland, which also appears dark green at this time of year. In early winter imagery, both types of wetlands appear dark green, the color of the seasonal wetlands contrasting with the adjacent annual grasslands, which at that time of year appeared brown.

The USFWS's National Wetlands Inventory (NWI) data layer was examined and compared with the aerial photographs to assist in the recognition of additional wetland areas, particularly seasonal wetlands with ambiguous signatures.

Coastal and Valley Freshwater Marsh

Coastal and valley freshwater marsh is dominated by emergent herbaceous plants (reeds, sedges, grasses) with either intermittent flooded or perennially saturated soils. Freshwater marshes are found throughout the coastal drainages of California wherever water slows down and accumulates, even on a temporary or seasonal basis. A freshwater marsh usually features shallow water that is often clogged with dense masses of vegetation, resulting in deep peaty soils. Plant species common to coastal and valley freshwater marsh predominantly consist of cattails (*Typha* spp.), bulrushes (*Schoenoplectus* and *Bolboschoenus* spp.), sedges (*Carex* spp.), and rushes (*Juncus* spp.). Dominant species in perennial freshwater wetland in the study area include rabbitsfoot grass (*Polypogon* sp.), nutsedge (*Cyperus eragrostis*), willow weed (*Persicaria lapathifolia* [*Polygonum lapathifolium*]), and water cress (*Rorippa* spp.). Broadleaf cattail (*Typha latifolia*) and water-primrose (*Ludwigia* spp.) are common associates (Jones & Stokes 2000). Dominant species in nontidal freshwater marsh are narrow-leaved cattail (*Typha angustifolia*), rice cutgrass (*Leersia oryzoides*), bur-reed (*Sparganium eurycarpum*), alkali bulrush (*Bolboschoenus* [*Scirpus*] *robustus*), and perennial peppergrass (*Lepidium latifolium*) (Jones & Stokes 2002).

Coastal and valley freshwater marsh occupy an estimated 381 acres (0.1%) of the study area (**Table 3-7** and **Figure 3-10**). This land cover type is generally found in lowland areas adjacent to diked tidal wetlands, along the margins of lakes and reservoirs, and along the lower reaches of the Guadalupe River and Coyote Creek, upstream of tidal influence (Santa Clara Basin Watershed Management Initiative 2003). Wetlands in the study area range in size from less than an acre to up to 42 acres. The largest wetland can be found along Coyote Creek north of Morgan Hill and just west of U.S. 101. Along the lower reaches of the Guadalupe River and Coyote Creek, freshwater wetlands transition downstream into wetlands influenced by brackish water with less cattail and other freshwater-adapted species to more salt-tolerant species such as California bulrush.

One of the largest freshwater wetlands in southern Santa Clara County is San Felipe Lake, immediately adjacent to the study area in San Benito County and adjacent to Highway 152. San Felipe Lake, sometimes referred to as Soap Lake, is a natural, seasonal lake, fed by Ortega Creek, Pacheco Creek, and Tequisquita Slough. The lake drains through Millers Canal in San Benito County, which in turn feeds the Pajaro River. The lake is part of a large floodplain called Bolsa de San Felipe (RMC 2005).

Covered species that may be found breeding in the coastal and valley freshwater marsh land cover type (**Table 3-5**) include tricolored blackbird, California red-legged frog, California tiger salamander, and western pond turtle. In addition, Bay checkerspot butterfly may move through this land cover type.

Seasonal Wetlands

Seasonal wetlands are freshwater wetlands that support ponded or saturated soil conditions during winter and spring and are dry through the summer and fall until the first substantial rainfall. The vegetation is composed of wetland generalists, such as hyssop loosestrife, cocklebur (*Xanthium* spp.), and Italian ryegrass that typically occur in frequently disturbed sites, such as along streams. Common species in seasonal wetlands within the study area include water cress, water speedwell (*Veronica anagallis-aquatica*), and smartweeds (*Persicaria* [*Polygonum*] spp.) (Jones & Stokes 2000). Other dominant species are California aster (*Symphyotrichum chilense* [*Aster chilensis*]), white sweet clover (*Melilotus albus*), and narrow-leaved cattail (Santa Clara Valley Water District 2002a).

Seasonal alkali wetlands historically occurred in two locations in the study area, around what is now Lake Cunningham in San José (San Francisco Estuary Institute 2006) and in the Soap Lake area near the Pajaro River (San Francisco Estuary Institute 2008). Small remnant stands of seasonal alkali wetlands may still persist in these areas but they were too small to be mapped in our regional mapping effort.

Vernal pools are seasonal wetlands that pond water on the surface for extended durations during winter and spring and dry completely during late spring and summer. They support a typical flora largely composed of native wetland plant species. Vernal pools in eastern Alameda and Contra Costa Counties occur in distinctive topography with low depressions mixed with hummocks or mounds.

Vernal swales and pools have been documented from one location in the study area, on private ranches north of Gilroy (WRA Environmental Consultants 2008). These swales and pools are dominated by meadowfoam (*Limnanthes* spp.), button celery (*Eryngium aristulatum* var. *hooveri*), and calicoflower (*Downingia* spp.).

"Vernal basins," which are seasonal wetland habitats found in grassland swales, have been documented in Coyote Lake-Harvey Bear Ranch (Rana Creek Habitat Restoration 2004)[18]. These basins host a limited flora that includes species such as coyote thistle (*Eryngium vaseyi*), African pricklegrass (*Crypsis vaginiflora*), and flowering quillwort (*Triglochin* [*Lilaea*] *scilloides*). Historically, there may have been more vernal pools and vernal basins in the study area.

[18] Features such as these vernal basins or swales may have been the source of the vernal pool records in California Department of Fish and Game (1998).

Seasonal wetlands were first mapped using only air photo interpretation. When only 25 acres were mapped using this method, we supplemented this approach with additional data (NWI data and large project mapping). As a result, 201acres, (0.04%) of the study area, of seasonal wetlands were mapped in the study area **Table 3-7** and **Figure 3-10**). Seasonal wetlands are likely still underrepresented in the land cover map because of their typically small size, isolated locations, and difficulty in interpreting the photographic signature of individual features. Because the land cover mapping was conducted primarily using aerial photos taken in December (2003 and 2005), some seasonal wetlands may have been mapped as coastal and valley freshwater marsh.

Western burrowing owl, San Joaquin kit fox, and Bay checkerspot butterfly may use seasonal wetlands as movement habitat. Both California tiger salamander and California red-legged frog use this land cover type for breeding and foraging (**Table 3-5**). Western pond turtle uses this land cover type for foraging. Tricolored blackbirds are known to use seasonal wetlands for foraging and breeding habitat.

Fragrant fritillary may occur within seasonal wetland land cover, however, data is insufficient for the study area (**Table 3-6**). This species would be restricted to specific habitat elements and micro-site characteristics within this land cover.

Ecosystem Functions

Function and Integrity

Wetland functional values are provided through several physical and biological processes (National Research Council 2001). Perennial and seasonal wetlands function as essential habitat for amphibians that depend on aquatic environments for reproduction and juvenile development. These wetlands also provide high levels of insect production, which in turn creates a major food source for amphibians, birds, and other insectivorous species. The cyclical nature of inundation and drought in seasonal wetlands allows these systems to support a unique suite of highly adapted biota. Perennial wetlands are permanent water sources during the dry season in an otherwise arid landscape and thus function as essential habitat for a wide variety of water-dependant wildlife.

Wetlands also perform important functions with regard to physical processes. For example, wetlands play an important role in regulating biogeochemical cycles such as the nitrogen cycle. Wetlands also mediate flows in local streams and springs by providing temporary surface water storage and gradual recharge to local aquifers. On a small scale, wetlands in the study area also reduce erosion and sedimentation by reducing surface runoff.

Marshes recharge groundwater supplies and moderate streamflow by providing water to streams. This is an especially important function during periods of drought. The presence of marshes in a watershed helps to reduce damage caused by floods by slowing and storing floodwater. As water moves slowly through a marsh, sediment and other pollutants settle down to the bottom of the marsh. Marsh vegetation and microorganisms also use excess nutrients for growth that can otherwise pollute surface water such as nitrogen and phosphorus from fertilizer.

Natural Disturbance

Seasonal flooding is a key natural disturbance in seasonal wetlands. Marsh and other wetland plant species must tolerate flooding during the growing season and thus be able to tolerate anoxic conditions. Prolonged flooding can kill off wetland plants if the shoots have been destroyed by grazing or fire prior to the flood event (Keddy 2000). Dry periods can function as a disturbance as well. Sediment deposition is a key feature of wetland communities. Seedlings are sensitive to sediment burial, which can prevent or reduce germination (Keddy 2000). As a marsh ages, vegetation accumulates and may fill the pools of open water present which can eventually lead to meadow creation (Faber 1982).

Threats

Threats to wetland land cover types include pollution, grazing, changes in hydrologic regime, conversion to other land uses such as agriculture or urban development, nonnative species invasion, and natural processes such as fire or flood. Fertilizer, pesticides, and untreated sewage contribute to pollution and result in a decrease in oxygen, which can kill vegetation within wetlands. Grazing disturbs the vegetation around marshes and can result in invasion of nonnative plant species into the marsh area (Holland and Keil 1995). The establishment and spread of invasive nonnative species can also result from urban ornamental landscape species (e.g., weeping willow [*Salix babylonica*], red sesbania [*Sesbania punicea*]) that are transported or reseed within drainages and watersheds, ultimately finding their way into downstream wetlands. Hydrologic regime changes can result from the construction of dams and weirs, extraction of groundwater and the creation of artificial drainages. Conversion of land to other uses can lead to the direct loss of wetland habitats as such lands are regraded and/or filled for such uses. In addition, increased stormwater runoff from impermeable surfaces can flow so rapidly into adjacent wetlands that it causes excessive scour and wetland habitat loss. Excessive sediment deposition following fire can virtually fill in wetlands, burying marsh vegetation.

Open Water

Open water land cover types consist of open water or aquatic habitats such as lakes, reservoirs, water-treatment ponds, sloughs, and ponds (including percolation and stock ponds) that do not support emergent vegetation. Open water habitat in the study area is classified into two land cover types.

- Pond.
- Reservoir.

Natural lakes were originally included as a separate land cover type. However, no natural lakes were mapped in the study area and therefore are not discussed below.

Historical Extent and Composition

Open water land cover types were historically less prevalent than they are currently. With only a few exceptions, lakes, reservoirs, and ponds did not exist in the Plan study area until they were built to support livestock and provide a water supply for the population of Santa Clara County.

Very few naturally occurring ponds existed historically in the study area. At least two large perennial freshwater ponds were located along the valley floor in the Coyote Watershed (Grossinger et al. 2006). Beginning in earnest in the mid-1800s with the advent of the gold rush, the population of the Santa Clara Valley grew rapidly. With this growth came ranchers who built hundreds of stock ponds in the study area to water grazing livestock, largely with technical and financial assistance from the U.S. Department of Agriculture (USDA) Soil Conservation Service. Stock ponds continue to dot the study area, including in now-protected open spaces.

Percolation ponds were also built throughout the study area to recharge the groundwater basin during wet and dry seasons. Currently, 71 percolation ponds are managed by SCVWD in the county for this purpose (Santa Clara Valley Water District 2002b). They are actively managed as “industrial water production facilities,” and most are in urbanized areas.

At least one seasonal lake, Laguna Seca, was located at the north end of the area now known as Coyote Valley at the base of the saddle between Tulare Hill and the Santa Theresa Hills (Grossinger et al. 2006). One or two perennial freshwater wetlands, which may have functioned more as a lake than a wetland during the wet season, also existed along the valley floor in the Coyote Creek watershed (Grossinger et al. 2006). These features were drained in 1919 to allow farming in the area.

Most lakes in the study area are man-made reservoirs that were built in the 1930s and 1950s, mostly for water supply purposes. SCVWD owns and operates seven dams and associated reservoirs (Almaden, Anderson, Calero, Coyote, Guadalupe, and Uvas, and Vasona) in the study area for water supply, and one reservoir, Chesbro Reservoir built in 1955, for flood protection and water supply purposes (Santa Clara Valley Water District 2005). Other reservoirs in the study area include the North Fork Pacheco Reservoir (built for agricultural water supply) and several small reservoirs located in unincorporated areas of the County along the western foothills of the Diablo Range.

Common Wildlife Associations

Open water land cover types provide drinking water, as well as foraging, breeding, and resting habitat for a variety of terrestrial and aquatic wildlife, including birds, amphibians, reptiles, and large mammals. Reptiles such as western pond turtle and garter snakes use available water resources and the vegetation surrounding open waters as habitat. Mammals use all types of open water resources for drinking and hunting.

All open water land cover types support a variety of ducks including mallard, green-winged teal, cinnamon teal (*Anas cyanoptera*), gadwall (*A. strepera*), American wigeon (*A. americana*), and American coot. Raccoons forage for adult and larval amphibians, fish, and crayfish.

Ponds attract many birds that are normally found in the adjacent grasslands; for example, California quail, mourning dove, and barn and cliff swallows (*Hirundo rustica* and *H. pyrrhonota*) all require daily water and are known to use ponds as water sources. The tricolored blackbird relies on vegetation associated with ponds (cattails and bulrush) for nesting. Many covered species, including California tiger salamander, California red-legged frog, and western pond turtle, use ponds as essential habitat; western pond turtle can be found inhabiting perennial ponds year-round and nesting in adjacent upland habitat during the nesting period. Ponds that contain either submerged or emergent vegetation are of particular importance to native amphibians as breeding habitat, although in ponds with little or no vegetation, California tiger salamander females may attach eggs to objects, such as rocks and boards on the bottom (Jennings and Hayes 1994). In perennial ponds, nonnative bass (*Micropterus* ssp.) and bullfrog (*Rana catesbeiana*) are common and are often prevalent wildlife species. Bass and bullfrog are known to prey on special-status California red-legged frog and California tiger salamander and, as such, the presence of bullfrogs and bass limits the opportunity for success of these covered species.

Percolation ponds have minimal habitat values due to their location in urban areas. Percolation ponds require aggressive maintenance to maintain percolation capacity and preserve groundwater recharge for the water supply. Ponds with wetland fringe habitat (i.e., emergent vegetation) provide potential habitat for western pond turtle, California red-legged frog, and California tiger salamander. Most percolation ponds have only marginal habitat value for the covered species.

Reservoirs support several gull species as well as raptors that fish out of the lake and often nest in tall trees nearby. Shore and wading birds including killdeer, black-necked stilt, greater yellowlegs, and several gull species are found in and at the edges of reservoirs within the study area. Reservoirs provide habitat for some native fish such as hitch, Sacramento blackfish, California roach, and Sacramento sucker, but favor nonnative fish such as bluegills, sunfish, brown bullheads, carp, goldfish and largemouth bass. Reservoirs can also provide suitable rearing habitat for non-migratory rainbow trout if conditions are favorable. Reservoirs also promote the presence of nonnative fish in the watershed by providing suitable habitat. Nonnative fish often prey on native fish; for example, largemouth bass may prey on juvenile steelhead trout (Santa Clara Basin Watershed Management Initiative 2003).

Covered species found within the open water community include Bay checkerspot butterfly (for movement), California tiger salamander, California red-legged frog, western pond turtle, and tricolored blackbird.

Open Water Land Cover Types

Ponds

Ponds are small (less than 20 acres) perennial or seasonal water bodies with little or no vegetation. If vegetation is present, it is typically submerged or floating. Ponds may occur naturally or may be created or expanded for livestock use (stock ponds). All ponds discernible on aerial photographs were mapped.

Ponds were easily discernible on the basis of two distinctive aerial photograph signatures. One signature—smooth, uniform, and dark black—indicates deeper and less turbid ponds. The other signature—light gray-brown—generally indicates a shallower or more turbid pond. The latter signature was more difficult to discern on the aerial photographs and in some cases required field verification or corroboration with other wetland mapping (e.g., National Wetland Inventory). Where discernible, this land cover type was mapped to the high water line. Some wetland land cover types were likely included as ponds if vegetation was sparse or not visible on photos. The minimum mapping unit was 0.25 acre.

Off-stream groundwater recharge ponds, (commonly referred to as *percolation ponds*) are used in the study area in the following locations (Santa Clara Basin Watershed Management Initiative 2003):

- along Los Gatos Creek downstream of Lexington and Vasona Reservoirs;
- along Alamitos Creek, Guadalupe Creek, and the Guadalupe River downstream of Almaden, Calero, and Guadalupe Reservoirs;
- along Coyote Creek downstream of Anderson Reservoir; and
- along Llagas Creek downstream of Chesbro Reservoir.

Percolation ponds are located at sites where gravels and sands have been naturally deposited at or near ground level and where water can soak down most easily into the aquifer(s) (Santa Clara Valley Water District 1978 as cited in Santa Clara Basin Watershed Management Initiative 2003). These ponds are designed to allow infiltration of water at specified rates and must be cleaned out periodically when fine sediments build up, impeding percolation. These off-stream ponds are filled in the winter months with natural flow from rainwater. During the drier months, the SCVWD augments groundwater recharge in percolation ponds with imported water, including water from the Central Valley Project (Santa Clara Basin Watershed Management Initiative 2003).

Stock ponds are also used throughout the study area to provide water to grazing livestock. Lands historically used for grazing, but currently protected as open space, also contain old stock ponds that may be in disrepair. One example is in Henry W. Coe State Park where many stock ponds still exist (A. Palcovik pers. comm.). Many of these ponds currently support California red-legged frog or California tiger salamander. Park managers have reclaimed some ponds, returning them to a more natural state. Pond reclamation typically includes removal of the dam. The result is a shortened or eliminated hydroperiod of standing water, which may reduce the habitat value for covered species.

Pond vegetation is influenced by surrounding land use, livestock and wildlife activity, and site soil and hydrology. Plants often associated with ponds include floating plants such as duckweed (*Lemna* spp.) or rooted plants such as cattails, bulrushes, sedges, rushes, water cress, and water-primrose. Stock ponds are often surrounded by grazing land with grazing livestock. Immediately adjacent to the stock pond, soil may be exposed due to the continued presence of livestock or wildlife (e.g., feral pigs). As a result, many stock ponds are devoid of vegetation. Covered species, such as California tiger salamander may still use this habitat for breeding. Females may attach eggs to objects, such as rocks and boards on the bottom (Jennings and Hayes 1994). Stock ponds, removed from grazing pressures or excessive wildlife activity, may be surrounded by wetland vegetation including willows, cattails, reeds, bulrushes, sedges, and tules (*Schoenoplectus* [*Scirpus*] *californicus*) if the appropriate soil and hydrology is also present. Land uses surrounding percolation ponds may vary depending on the location of the pond. Percolation ponds are often found in more urbanized areas; therefore, the vegetated buffer may be narrower than it would be in a natural setting or managed for weed abatement.

Ponds are scattered throughout the study area, with the heaviest concentrations in the southeast corner of the study area, away from urbanized areas. **Figure 3-13** depicts the distribution of pond density in the study area. There are an estimated 716 ponds that occupy approximately 1,110 acres (0.2%) of the study area (**Table 3-7** and **Figure 3-10**).

Several species covered by this Plan can be found in or using ponds including California tiger salamander, California red-legged frog, western pond turtle, and tricolored blackbird. Bay checkerspot butterfly may pass over ponds on their way to habitat patches.

Reservoirs

Reservoirs are large open water bodies, greater than 20 acres that are highly managed for water storage, water supply, flood protection, or recreational uses. These features were easily targeted on aerial photographs based on the smooth, uniform, dark signatures of open water. Where discernible, reservoirs were mapped to the high water line. The high water line was observed on the aerial photographs as either obvious rings of sparse vegetation or an open water signature.

Plants often associated with reservoirs include those plants common to deep water systems. Algae are the predominant plant life found in the open waters of reservoirs. Depending on reservoir temperature, water level, and other environmental conditions, algal blooms may occur, resulting in thick algal maps on the surface of the reservoir. If the reservoir edges are shallow, plant species similar to those found in ponds may be present. If the reservoir has steeper edges, water depth and fluctuations in reservoir height may prevent the establishment of vegetation. Upland and riparian trees that were not removed during the construction of the reservoir, or that were planted afterwards, may be present around the perimeter of the reservoir. Fluctuations in water levels may also affect the type of shoreline habitat that occurs around reservoirs (Santa Clara Basin Watershed Management Initiative 2003). The upstream end of several reservoirs including Coyote Reservoir support large and important stands of riparian forest and woodland (these areas were mapped as riparian woodland).

Surrounding land uses at reservoirs vary depending on the location of the reservoir and the land cover type present in the area prior to reservoir development. Reservoirs are dispersed throughout the study area. Vasona, Guadalupe, and Almaden Reservoirs are located on the western border of the study area. Calero, Chesbro, and Uvas Reservoirs are located in the foothills of the Santa Cruz Mountains, west of Coyote Valley, Morgan Hill, and San Martin. Anderson and Coyote Reservoirs are located in the foothills of the Diablo Range, east of Morgan Hill and San Martin. Pacheco Reservoir is located in the southeast corner of the County, north of SR 152. Reservoirs occupy approximately 2,767 acres (0.6%) of the study area in 18 locations (**Table 3-7** and **Figure 3-10**).

Species covered by this Plan that may be found living in or using reservoirs are western pond turtle and tricolored blackbird.

Ecosystem Functions

Function and Integrity

Open water land cover types perform a variety of functions in both biological and physical terms. Biologically, water is the most critical component required to support the lifecycle of all aquatic and terrestrial species. Open water land cover types support the species at the lowest level of the food chain, algae. Aquatic invertebrates feed on algae and other plant debris in creeks, ponds, and reservoirs. In turn, these invertebrates become food for fish, birds, bats, and other insect-feeding species. The cycle continues, supporting species of the highest trophic levels including coyotes, mountain lions, and humans.

Ponds enhance all other habitats in terms of value for wildlife. Mammals, birds, reptiles, and amphibians from adjacent habitats are likely to use ponds en route to surrounding areas (Santa Clara Basin Watershed Management Initiative 2003). Many upland species rely on streams and ponds as water sources, especially during the dry summer months.

Percolation ponds, while often seasonally stable in water level, are highly manipulated and provide varying degrees of habitat value. While emergent vegetation frequently develops along the shoreline of percolation ponds, the buffer zone between these emergent wetlands and adjacent urban land uses, such as parks or housing, limit wildlife access and use of these ponds by mammals, amphibians, and reptiles. While birds maintain access to percolation ponds, human activity and domestic pets around the shoreline limit nesting by waterfowl and other birds (Santa Clara Basin Watershed Management Initiative 2003). Periodic maintenance of percolation ponds can interrupt aquatic system functions, resulting in the loss of those primary food chain constituents such as detritus, algae, and emergent vegetation.

Reservoirs are sediment sinks, obstructing the natural sediment transport of streams. Through natural processes, streams erode sediment from stream banks and move it down stream. In an unimpeded setting, sediment carried from the upper watershed is deposited along the length of the stream, thus creating an equilibrium of eroded and deposited sediment. When a dam is built across a stream, all but some of the finest sediment transported from the upper watershed drops out of suspension in the reservoir, where velocities are too low to maintain the sediment load. The resulting effect is that downstream reaches are sediment-starved, and no new sediment is available to replace eroded sediment downstream of the dam. This results in the stream downcutting and deepening and also results in a reduction in gravels downstream of reservoirs. In addition, large reservoirs fill with and store large amounts of turbid storm runoff. Settling of the finer clay and silt particles may take months, resulting in persistent releases of turbid water in winter and early spring. The slowly settling materials may also result in much higher turbidities near the bottom outlet valve than in the surface waters. While the natural streams upstream of reservoirs rapidly clear between storms, the streams downstream of reservoirs may be persistently turbid. In addition, the slowly released fine sediments may result in silty substrate below the reservoirs, reducing abundance of insects. During parts of the year, the reservoir conditions may produce bioturbidity from organic production in the water column. Turbidity can also be caused by bio-productivity in the water column, which may affect the efficiency of visual feeding organisms.

Reservoirs disrupt the natural flow cycle of streams. In addition, because the reservoirs are deep and store cool winter runoff, the water released out of the bottom of the reservoir can be much cooler than the surface water and also cooler than the stream upstream of the reservoir in late spring and summer.

Natural Disturbance

The role of disturbance in open water land cover types focuses on the mixing of water from the surface to the bottom. Wind contributes heavily to mixing of water in ponds and lakes. Mixing brings oxygen to the bottom of ponds and lakes while releasing nutrients into the water column that will feed plants and invertebrates. Disturbances to standing water bodies often relate to *eutrophication*, the natural processes by which excessive nutrients are deposited into the water body, stimulating plant growth. This rapid plant growth, often referred to as an *algal bloom*, reduces dissolved oxygen in the water as anaerobic microbes break down dead plant material. Reduced levels of dissolved oxygen, as well as reduced penetration of sunlight into the water, often lead to the die-off of other aquatic organisms. Eutrophication eventually leads to the filling in of the water body. Both ponds and reservoirs are susceptible to rapid eutrophication. In urbanized areas, or in areas with septic tanks or grazing livestock, this process is enhanced by excess nutrient input. Oxygen-depleting algal blooms may lead to fish kills.

Reservoirs may also suffer from a lack of mixing surface waters with water at deeper depths. Mixing distributes oxygen to the reservoir floor, preventing anaerobic conditions that may reduce the dissolved oxygen in the reservoir. Maintaining appropriate levels of dissolved oxygen is important for aquatic life in the reservoir and downstream of the reservoir, as well as for drinking water supplies. Dissolved oxygen levels are also affected by water temperature. Warmer water contains lower levels of dissolved oxygen.

Threats

Open water land cover types are threatened by pollution; livestock disturbance, including trampling and excessive nutrient inputs leading to rapid eutrophication; high water flows which cause erosion; habitat destruction; and unnatural channel modification resulting from the need to contain flows. The manipulation of otherwise natural processes (flooding, natural stream meandering) changes the ecosystem function of aquatic communities and generally reduces overall biodiversity and native survivorship by eliminating a dynamic component of the ecosystem. The various open water land cover types have different primary threats, as described below.

Pond breaching, berm failure, livestock and wildlife impacts, including feral pigs, and inadequate management practices can increase soil erosion and result in increased sedimentation of the pond (Hamilton and Jepson 1940; Prunuske 1987). This reduces habitat quality for amphibian habitat. Alternatively, ponds with insufficient turbidity provide inadequate cover for California tiger salamander larvae (69 FR 47216). Heavy livestock and excessive wildlife use (e.g., feral pigs) use can degrade ponds quickly, leading to loss of emergent vegetation and eutrophication from increased nitrogen due to cattle urine. High flows cause erosion, unless fully cemented channels are in place. To control flooding, channels are modified in an unnatural way (i.e., placement of rip rap, lined with concrete) and results in a decrease of riparian vegetation and aquatic habitat for fish and other species. Some cities are working to address this issue. For example, the City of San José requires that riparian vegetation be avoided during construction activities, and if it cannot be avoided, mitigation is required. Mitigation requires replacement of riparian vegetation and/or compensation for any adverse affects to creeks (City of San José 2005). Additionally, pollution sources along the channels can degrade water quality within riverine systems.

Irrigated Agriculture

Irrigated agriculture encompasses all areas where the native vegetation has been cleared for irrigated agricultural use. This natural community does not include rangeland, which is often characterized as an agricultural land use. The irrigated agriculture community is classified into four land cover types.

- Orchard.
- Vineyard.
- Agriculture developed.
- Grain, row-crop, hay and pasture, disked/short-term fallowed[19].

In all of these cases, the land may have been irrigated in the past but show little or no sign of irrigation currently (e.g., fallow fields). In some instances these

[19] This land cover type may or may not be irrigated.

land cover types were indistinguishable on aerial photographs (e.g., newly planted orchards strongly resemble row crops). In such cases the area in question was mapped as grain, row-crop, hay and pasture, and disked/short-term fallowed.

Historical Extent and Composition

Father Junípero Serra gave Santa Clara Valley its name when he consecrated the Mission Santa Clara de Asis in 1777 (National Park Service 2006). The establishment of the mission also heralded the beginning of large-scale agriculture in the Santa Clara Valley. Soon, the Guadalupe River dam (located near Mission Santa Clara) was constructed for irrigation of wheat, corn, bean, and other crops. Fruit trees and grapes were also cultivated. Settlers' accounts during 1850 describe the whole plain of Alameda County to San José as a vast unfenced field of grain (Santa Clara Basin Watershed Management Initiative 2003).

The Santa Clara Valley has experienced continued population growth since 1850. By 1866, artesian wells could no longer meet water demands. In 1870, Los Gatos Creek was diverted in order to meet the water demands for agriculture and a booming population (Santa Clara Basin Watershed Management Initiative 2003). Agricultural success in the Santa Clara Valley was supported by access to railroads that could take goods to port. Large aquifers were also discovered underlying the valley and were tapped by artesian wells. These two factors bolstered a rapid increase in agriculture in the region. The area produced carrots, almonds, tomatoes, prunes, apricots, plums, walnuts, cherries, and pears for the world market (National Park Service 2006). In 1870, seed farms became another dominant form of agriculture in the valley. Other agricultural commodities harvested from the Santa Clara Valley included lumber and grapes for wineries (National Park Service 2006).

By 1930, there were 120,000 acres of orchards in production (Santa Clara Basin Watershed Management Initiative 2003). The Santa Clara Valley remained largely rural and agricultural, supporting farms, orchards, wineries, and ranches until after World War II (National Park Service 2006). Due to an increased demand for urban services, there was a one-third reduction in the amount of cultivated lands between 1947 and 1961 (Santa Clara Basin Watershed Management Initiative 2003). Despite these changes, the South Valley in Santa Clara County continues to support rural homesteads and agriculture.

Common Wildlife Associations

Some native wildlife, such as small mammals, certain raptors, and migratory waterfowl, utilize irrigated agriculture seasonally or year-round. Year-round activity tends to be concentrated along the margins of active farmland where vegetation is less disturbed or where trees and shrubs tend to occur (some are planted deliberately as windbreaks). Open fields that are irrigated for forage crops are also used by wildlife. Cultivated agriculture is bisected by streams, ditches, and channels. Some amphibians and reptiles utilize these linear aquatic features and the adjacent upland habitat.

Orchard and vineyard fruits attract common wildlife species such as scrub-jay, European starling (*Sturnus vulgaris*), western tanager (*Piranga ludoviciana*), Brewer's blackbird, American crow, yellow-billed magpie (*Pica nuttalli*), raccoon, opossum, California vole, and coyote. Orchards and vineyards that are not plowed provide foraging, cover, and denning sites for native gray fox and nonnative red fox (*Vulpes vulpes*), burrowing owl, California ground squirrel, and various gophers, mice, and snakes (Santa Clara Basin Watershed Management Initiative 2003). Insects are important pollinators of blossoms to ensure fruit. Owls and other raptors such as white-tailed kite, red-shouldered hawk, red-tailed hawk, and burrowing owl feed on rodents and insects found in orchards and vineyards. Old buildings and barns may provide shelter for bats and owls (Santa Clara Basin Watershed Management Initiative 2003).

Data collected in Sonoma County indicate that vineyards generally support a far higher abundance of nonnative predators such as red fox and feral cats than do adjacent natural habitats (Hilty and Merenlender 2004). Other common wildlife species found in most vineyards include California ground squirrel, European starling, and Brewer's blackbird. As in other forms of agriculture, site-specific production methods are directly correlated with wildlife use. Some vineyard practices may encourage habitat use by birds of prey such as American kestrel and great horned owl (Locke 2002). Wildlife use of vineyards may be related to the timing and intensity of pesticide application with heavy pesticide use decreasing wildlife use and reproductive success.

Dryland crops are usually established on fertile soils that have historically supported a variety of wildlife (Mayer and Laudenslayer 1988). Although grain cropland cover supports reduced wildlife habitat richness and diversity for native species, it does support a greater variety of wildlife species than traditional irrigated agricultural land cover (e.g., vineyards and orchards). Short-grass habitat associated with dryland grain production is compatible with foraging by raptors such as western burrowing owl. During winter, this type of agricultural land also provides important foraging and roosting habitat for wintering waterfowl.

Pastures support a variety of wildlife, particularly ground-nesting birds such as western meadowlarks (*Sturnella neglecta*). Irrigated pasture, particularly alfalfa, can provide a variety of wildlife benefits due to its relatively high production of small rodents. Several birds that forage in open grasslands, such as white-tailed kites and great blue herons, may also use this land cover type.

Irrigated Agriculture Land Cover Types

Orchard

Orchards are those areas planted in fruit-bearing trees. Orchard was distinguished on the basis of its tree cover, canopy characteristics, and distinctive production rows. In Santa Clara County, orchards mostly include apricots, cherries, prunes, and walnuts (County of Santa Clara, Department of Agriculture 2004).

Orchards comprise an estimated 2,697 acres (0.06%) of the study area (**Table 3-7** and **Figure 3-10**). Orchards are scattered in relatively small patches throughout the Santa Clara Valley floor from the southern point of San José south to the county line. The largest patch of orchard is found in Coyote Valley in the area designated as the Coyote Greenbelt. Small orchards are also present south of Highway 130 in the Diablo Range foothills.

Some covered species may be found in orchards. For example, where natural open spaces abut, some individuals of San Joaquin kit fox may forage in and disperse through orchards. Western burrowing owl may forage in and move through orchards. Tricolored blackbirds may move through and/ or forage in and over orchards. Bay checkerspot butterfly, California red-legged frog and California tiger salamander may migrate through orchards between areas of suitable habitat. Western pond turtle may nest along the open margins of orchards, particularly if situated adjacent to suitable aquatic habitat (**Table 3-5**).

Vineyard

Vineyard was identified on the basis of its row production pattern and canopy characteristics. Vineyards appeared similar to orchards on the aerial photographs but were characterized by more closely spaced rows with a smaller, less dense vegetation canopy.

Vineyards occupy 1,393 acres (0.3%) of the study area (**Table 3-7** and **Figure 3-10**).Vineyards are mostly located in the southern portion of the county, in the foothills west of San Martin, along Uvas Creek and its tributary Little Arthur Creek, and along SR 152 east of Gilroy. Similar covered species are expected to be found in vineyards as in orchards, with the exception of burrowing owl (**Table 3-5**).

Agriculture Developed

Agriculture developed was identified by the presence of large agricultural buildings such as greenhouses, shadehouses, nurseries, corrals, or dairies. These intensive uses were found within agricultural areas rather than urban settings. Air photo signatures were generally distinctive because of their large agricultural structures or high densities of livestock.

This land cover type occupies 1,935 acres (0.4%) of the study area in small patches scattered throughout the Santa Clara Valley from Coyote Valley to the county line (**Table 3-7** and **Figure 3-10**). Covered species that may be found in this land cover type include western burrowing owl (e.g., in some of the larger corrals that may be less intensively used), tricolored blackbird, and migrating Bay checkerspot butterfly and San Joaquin kit fox (**Table 3-5**).

Grain, Row-Crop, Hay and Pasture, Disked/Short-Term Fallowed

Tilled land not appearing in the aerial photographs to support orchard or vineyard was mapped as grain, row-crop, hay and pasture, disked/short-term fallowed. *Grain, row-crop, hay and pasture, disked/short-term fallowed* is the most common of the agriculture land cover types in the low-lying areas of the study area, occupying 33,648 acres (7.3%) of the study area (**Table 3-7** and **Figure 3-10**). These lands are abundant throughout the Santa Clara Valley south of San José, and are most dense just north of the southern county border.

Row-crops are those areas tilled and cultivated for agricultural crops such as corn, lettuce, peppers, and pumpkins. *Fallow fields* include fields that were not in production at the time aerial photos and/or site visits were conducted, but may be utilized for grain, row-crops, and hay and pasture in subsequent years. This land cover type includes ruderal areas that had been left fallow for several growing seasons. Ruderal sites may be dominated by weeds such as black mustard or thistles.

Hay and *pasture* include both dryland settings and irrigated areas. The key difference between hay production and pasture is that crops are harvested on site and consumed off site, whereas pasture is consumed by livestock on site (hay is also cut, bailed, and trucked off site). In addition to production for consumption, hay is also produced in Santa Clara Valley for grain. The pasture land cover type consists of fast-growing annual and perennial grasses mixed with irrigated forage crops in the legume family. Pastures typically function as onsite sources of forage for livestock. These areas are distinguished from other cultivated land types by the presence of livestock and livestock fencing (paddocks). Pastures tend to occur in lowland areas adjacent to cropland. Pasture was mapped on aerial photographs based on its location and smooth texture on the photographs, indicating land that is covered by vegetation and not currently tilled for cropland.

Common vegetation includes fast-growing forage grasses, such as wild oats and Italian ryegrass, as well as irrigated legumes such as alfalfa (*Medicago sativa*), sweet clover (*Melilotus* spp.), and true clover (*Trifolium* spp.). In some areas, nonnative weedy vegetation, such as thistles, mustards, and a variety of other weedy forbs, are also common.

Covered species expected to be found in this land cover type are tricolored blackbird, and western burrowing owl all of which forage in grain crops and pastures (**Table 3-5**). Tricolored blackbird and western burrowing owls may also breed in agricultural settings. San Joaquin kit fox may move through this land cover type if it occurs near suitable grassland areas. California tiger salamander, California red-legged frog, and western pond turtle move through croplands to reach suitable breeding and aestivation habitat. Bay checkerspot butterfly migrate through these habitats between patches of serpentine grassland.

Ecosystem Functions

Function and Integrity

This land cover type has relatively low value for native plants and wildlife in terms of habitat that supports full lifecycle needs. Nonetheless, agriculture does provide some benefit, although species composition depends heavily on the planting cycle. For example, cropland has a higher value for terrestrial mammals (e.g., black-tailed jackrabbit) and herbivorous birds (e.g., red-winged blackbird) near harvest time, when the standing crop is mature and produces a quantity of food (e.g., fruit, seeds), than it does after the harvest when the cropland is fallow. Agricultural production methods can also have an impact on wildlife use. For example, production practices such as *clean farming*, where farm edges are maintained as vegetation-free areas, reduce cover and movement opportunities for wildlife; on the other hand, *wildlife friendly farming*, where native cover crops and hedge rows are used between crops and on farm edges, can increase opportunities for wildlife use in croplands.

In addition, agricultural lands often play a key role in providing connectivity between larger open space areas, especially in urbanizing areas such as the Santa Clara Valley. Maintaining connectivity between open space patches that provide habitat supports a diversified genetic pool due to the ability of populations to disperse and co-mingle. Agriculture also often is associated with streams, canals, and ditches used for irrigation that may support riparian vegetation, trees (planted as windbreaks), and shrubs. These areas may provide habitat to songbirds, raptors, amphibians and reptiles, as well as provide a movement corridor for other species.

Natural Disturbance

Disturbances common to cropland, orchards, and vineyards relate to the standard operations of farming practices. Seasonal tilling, planting, and harvesting prevent the long-term establishment of plants or animal burrows on this land. Management practices also usually include the application of pesticides, discouraging the establishment of plants or presence of wildlife. Furthermore, offsite drift may harm wildlife or plants in adjacent open space areas.

Threats

Orchards, vineyards, and row-crops are often found in areas of low to moderate topographical variation—areas such as valley floors or foothills. In these areas, the major threat to irrigated agriculture is land conversion to urban uses, often as residential housing.

Developed

Developed land cover types were mapped and described for the study area in order to describe the extent and distribution of modified lands. Developed areas were classified into the land cover types listed below.

- Urban-suburban.
- Rural-residential.
- Barren.
- Landfill.
- Golf courses/urban parks.
- Ornamental woodland.

Developed land cover types were mapped on the basis of their distinct signatures on aerial photographs and are readily distinguishable from naturally occurring signatures in any terrain. The minimum mapping unit for all developed land cover types was 10 acres.

Common Wildlife Associations

Developed, or urban, areas tend to support a low diversity of wildlife (Dickman 1987; Gilbert 1989). However, what species do exist in urban areas tend to be present at greater concentrations than is typical of other habitat types (Gilbert 1989). A limited number of mostly nonnative species such as dogs, cats, house mice, Norway brown rats, pigeons, European starlings, and opossums thrive in urbanized habitats in the study area (Santa Clara Basin Watershed Management Initiative 2003).

Several species are common to urban areas, including a variety of bird species that adapt well to urban landscapes. Typical bird species found in the urban landscape include the American robin (*Turdus migratorius*), mockingbird (*Mimus polyglottos*), American crow (*Corvus brachyrhynchos*), and European house sparrow (*Passer domesticus*). These species are typically generalized opportunistic foragers that are highly tolerant of human activity. Few special-status avian species occur in urban areas, however, there are some notable exceptions. As discussed below, western burrowing owl, covered in this Plan, may be found in ruderal or barren remnant patches in urban areas. Peregrine falcons (*Falco peregrinus*) are found even in downtown San José, where one pair nested in 2006. In 2006 a colony of approximately 200 red-winged blackbirds and tricolored blackbirds was documented during field work for this project using the southern fringe of a pond located adjacent to U.S. 101 in a vacant lot in Morgan Hill.

Some wildlife species are abundant in the ruderal areas of agricultural sites where there is no disturbance from tilling and pest control measures. This is especially true for burrowing mammals such as California ground squirrels. Western fence lizards and gopher snakes, which often use mammal burrows for cover, are also more common in these urban areas. Other common wildlife found in urban areas include rodents, grey squirrel, opossum, raccoon, and skunk. Other wildlife, once less common in urban areas but now on the rise across the country, include deer, coyote, and wild turkeys.

Ornamental woodlands, including eucalyptus stands, are occasionally planted as wood lots or shelter belts. The overall wildlife value of ornamental woodlands is highly variable and depends on the species planted. For example, eucalyptus trees provide night roosts, foraging perches, and nest sites for a few bird species, particularly raptors. Eucalyptus bark peels can create microhabitats for some small vertebrate species, such as alligator lizards and woodrats (Santa Clara Basin Watershed Management Initiative 2003).

Developed Land Cover Types

Developed areas comprise all types of development for residential, commercial, industrial, transportation, landfill, landscaping, and recreational uses (e.g., sites with structures, paved surfaces, horticultural plantings, golf courses, and irrigated lawns). Developed sites were mapped on the basis of their distinct signatures on aerial photographs. Developed areas are often characterized by geometric or regular shapes, and are readily distinguished from naturally occurring signatures in any terrain. This category was separated into six land cover types: urban-suburban, rural residential, barren, landfill, golf courses/urban parks, and ornamental woodland.

Urban-Suburban

The *urban-suburban* land cover comprises areas where the native vegetation has been cleared for residential, commercial, industrial, transportation, or recreational structures, and is defined as one or more structures per 2.5 acres. These include areas that have structures, paved and impermeable surfaces, horticultural plantings, and lawns smaller than 10 acres (irrigated lawns larger than 10 acres were mapped as urban parks). Many small, rural residential areas were observed in the inventory area. Such areas were mapped as urban if they exhibited at least 10 acres of buildings, turf, and pavement. Rural residential areas of less than 10 acres that were adjacent to or surrounded by agriculture and/or natural land cover types were mapped as the adjacent land cover type. Parcels of non-urban land cover types within the study area on which development projects were already approved were mapped as urban-suburban.

Vegetation found in the urban-suburban land cover type is usually in the form of landscaped residences, planted street trees (i.e., elm, ash, liquidambar, pine, palm), and parklands. Most of the vegetation is composed of nonnative or cultivated plant species. One invasive nonnative tree, the tree-of-heaven, has become established in yards and vacant lots in the City of San José area (Santa Clara Basin Watershed Management Initiative 2003).

The major urban-suburban area in the study area is San José, located in the northern portion of the Santa Clara Valley. Other urban-suburban areas include areas within Morgan Hill and Gilroy. Urban-suburban areas comprise 89,438 acres (19.4%) of the study area (**Table 3-7** and **Figure 3-10**).

It is unlikely that any covered species would be found in urban-suburban areas; however, Bay checkerspot butterfly may migrate across urban-suburban areas (i.e., parking lots) between patches of serpentine grassland. Still, this land cover type is largely characterized by impermeable surfaces and extreme hazards to wildlife that provide no habitat value.

Rural Residential

The *rural residential* land cover type is similar to the urban-suburban type except that it is typically much less dense (defined as less than 1 structure per 2.5 acres) and usually contains extensive landscaping and/or irrigated lands (including small areas of pasture).

Rural residential areas are mainly located in the foothills along the eastern edge of San José, at the southern point of San José near Almaden Quicksilver County Park and Santa Teresa County Park, and south of Morgan Hill and north of Gilroy. Rural residential areas comprise 12,414acres (2.7%) of the study area (**Table 3-7** and **Figure 3-10**).

Several covered species may be found in rural residential areas. Species such as California red-legged frog, western pond turtle, western burrowing owl, tricolored blackbird, or San Joaquin kit fox may move through rural residential land cover if it occurs adjacent to or near open space. Bay checkerspot butterfly will move through rural residential areas to disperse between patches of serpentine grassland. Rural residential areas that contain small patches of serpentine soils may be used by dispersing Bay checkerspot butterflies as temporary foraging sites.

Barren

Barren land cover types are non-agricultural areas that have been historically and recently disturbed. Land uses in this type include aggregate facilities and mine tailings. Barren land use types are uncommon throughout the study area. Barren land use types comprise only 211 acres (0.05%) of the study area in 6 locations.

While barren landscapes do not provide high quality for most covered species, this land cover type is often suitable for foraging and breeding western burrowing owls (**Table 3-5**). San Joaquin kit fox and tricolored blackbird may move through and/or forage in barren areas. California tiger salamander, California red-legged frog and Bay checkerspot butterfly may migrate through barren areas between habitat patches.

Landfill

Landfills are those areas where vegetation has been cleared and large amounts of soil have been moved for solid waste disposal. Typically, these areas are excavated pits into which refuse is placed and compacted. After a landfill is closed and capped, it may be returned to natural habitats through planting and management. Only active landfills were mapped in this category.

There are three landfills within the study area: San José's Guadalupe and Kirby Canyon landfills, and a landfill east of Gilroy. The Guadalupe landfill is located on the border of the study area; it has a 411-acre permitted facility boundary and a 115-acre permitted disposal area. Eighty-eight acres of this facility (21%) is inside the study area. The Kirby Canyon landfill has a 760-acre facility boundary and a 311-acre disposal area, all of which is in the study area. The Gilroy landfill is approximately 82 acres.

Landfills were mapped as occurring on 364 acres (0.02%) of the study area (**Table 3-7** and **Figure 3-10**). The difference in mapped acreage and locally-approved boundaries indicates that the landfills are expected to expand in the future.

Landfills are highly disturbed areas while in use. They often attract some wildlife such as gulls, crows, pigeons, and rats. The only covered species that may be found in landfill areas is Bay checkerspot butterfly as it migrates between suitable habitat patches.

Golf Courses/Urban Parks

Urban parks are located within cities in the study area and tend to be smaller in scale than a county or regional park. Many serve as neighborhood or community parks.

Urban parks and *golf courses* are located throughout the urbanized areas of the study area. Urban parks and golf courses comprise 8,673 acres (1.9%) of the study area (**Table 3-7** and **Figure 3-10**).

Golf courses and urban parks provide limited habitat for native wildlife. Urban parks are unlikely to support any covered species. Golf courses on the fringe of urban areas are known to support California tiger salamander, California red-legged frog, western pond turtle, western burrowing owl, San Joaquin kit fox or tricolored blackbird, particularly if ponds are present on or near the golf course (**Table 3-5**). Bay checkerspot butterfly may migrate through this land cover type between habitat patches.

Ornamental Woodland

Ornamental woodlands are those areas where ornamental and other introduced species of trees, including Eucalyptus, have been planted or naturalized and dominate, forming an open to dense canopy.

Ornamental woodland was mapped primarily in areas surrounded by development, where the signatures on aerial photographs and locations did not meet the characteristics of oak or riparian woodlands. Ornamental woodland was included as a separate land cover type because some stands could provide suitable habitat for raptors. The ornamental woodlands land cover type comprises only 95 acres (0.02%) of the study area (**Table 3-7** and **Figure 3-10**).

While ornamental woodland land cover does not provide appropriate habitat for most covered species, this land cover type may support breeding raptors.

Table 3-1. Natural Community Classification and Land Cover Types

Natural Community	Land Cover Type	Sensitive Land Cover Type*
Grassland	California annual grassland	
	Non-serpentine native grassland (not mapped)	✓
	Serpentine bunchgrass grassland	✓
	Serpentine rock outcrop	✓
	Serpentine seep	✓
	Rock outcrop	
Chaparral and Northern Coastal Scrub	Northern mixed chaparral/chamise chaparral	
	Mixed serpentine chaparral	✓
	Northern coastal scrub/Diablan sage scrub	
	Coyote brush scrub	
Oak Woodland	Valley oak woodland	✓
	Mixed oak woodland and forest	
	Blue oak woodland	
	Coast live oak forest and woodland	
	Foothill pine—oak woodland	
	Mixed evergreen forest	
Riparian Forest and Scrub	Willow riparian forest and scrub	
	Central California sycamore alluvial woodland	✓
	Mixed riparian forest and woodland	
	Riverine (also called streams)	
Conifer Woodland	Redwood forest	
	Ponderosa pine woodland	
	Knobcone pine woodland	
Wetland	Coastal and valley freshwater marsh	✓
	Seasonal wetland	✓
Open Water (Aquatic)	Pond	
	Reservoir	
Agriculture	Orchard	
	Vineyard	
	Agriculture developed	
	Grain, row-crop, hay and pasture, disked/ short-term fallowed	
Developed	Urban-Suburban	
	Rural residential (<1 unit per 2.5 acres)	
	Golf courses / Urban parks	
	Landfill	
	Ornamental woodland	
	Barren	

* Equivalent to sensitive natural communities as defined by the California Department of Fish and Game (California Department of Fish and Game 2003a).

Table 3-2. Crosswalk of Land Cover Classification to Other Classification Systems

Habitat Plan Land Cover Type	Manual of California Vegetation and CDFG Vegetation Code [1]	CWHR[2] Habitat Type	Coyote Ridge Vegetation Associations[3]	GAP Map—Santa Clara County	SFPUC Alameda Watershed HCP Land Cover Types[4]
Grassland					
California annual grassland	41.280.00	Annual grassland	*Aegilops triuncialis* alliance, *Lolium multiflorum-Hemizonia congesta* (mixed herb) association, *Avena* spp. alliance, *Bromus hordeaceus* alliance, *Plantago erecta* alliance	Annual grassland	Nonnative grassland
Non-serpentine native grassland (not mapped)	41.150.00	Annual grassland	*Leymus triticoides* alliance, *Melica torreyana* grassland alliance, *Elymus multisetus* alliance, *Vulpia microstachys* grassland alliance, Purple Needlegrass alliance	Annual grassland	Valley needlegrass grassland
Serpentine bunchgrass grassland	41.280.00	Annual grassland	*Plantago erecta* alliance, *Vulpia microstachys* alliance, *Melica torreyana* grassland alliance, *Nasella pulchra* alliance, *Elymus multisetus* alliance, *Lolium multiflorum-Nassella pulchra-Astragalus gambelianus-Lepidium nitidum* association, *Lolium multiflorum-Nassella pulchra-Calystegia collina* (mixed herb) association	Annual grassland	Serpentine bunchgrass grassland
Serpentine rock outcrop	None	None	Not mapped	Barren	not mapped
Serpentine seep	45.56x.00 (in part)	Fresh Emergent Wetland	*Cirsium fontinale* var. *campylon* alliance, *Juncus xiphioides* alliance	Not mapped	Freshwater seep
Rock outcrop	99.900.04/ 99.900.05	None	Not mapped	Barren	Rock outcrop

Habitat Plan Land Cover Type	Manual of California Vegetation and CDFG Vegetation Code[1]	CWHR[2] Habitat Type	Coyote Ridge Vegetation Associations[3]	GAP Map—Santa Clara County	SFPUC Alameda Watershed HCP Land Cover Types[4]
Chaparral and Coastal Scrub					
Northern mixed chaparral/chamise chaparral	37.000.01 / 37.101.00	Mixed chaparral / chamise-redshank	*Prunus illicifolia* alliance, *Arctostaphylos glauca* alliance, *Cercocarpus betuloides* alliance, *Adenostoma facsiculatum-Arctostaphylos glauca-Mimulus aurantiacus*	Mixed chaparral/ chamise-redshank chaparral	Not mapped
Mixed serpentine chaparral	37.000.06	Mixed chaparral	*Rhamnus tomentella* alliance, *Pinus sabiniana/Artemisia californica-Ceanothus ferrisiae-Heteromeles arbutifolia,* *Adenostoma fasciculatum-Heteromeles arbutifolia/Melica torreyana,* *Arctostaphylos glauca* mixed *(Artemisia californica-Salvia mellifera),* *Arctostaphylos glauca/Melica torreyana,* *Artemisia californica-Ceanothus ferrisiae,* *Quercus durata* alliance	Mixed chaparral	Serpentine foothill pine-chaparral woodland?
Northern coastal scrub/Diablan sage scrub	(32.000.00)	Coastal scrub	*Salvia mellifera* alliance, *Artemisia californica/Eschscholzia californica*-Grass, *Artemisia californica-Salvia mellifera*	Coastal scrub	Diablan sage scrub
Coyote brush scrub	32.060.00	Coastal scrub	*Baccharis pilularis* alliance	Coastal scrub	Not mapped
Oak Woodland					
Valley oak woodland	71.040.05	Valley oak woodland	Not mapped	Valley oak woodland	Valley oak woodland, oak savannah
Mixed oak woodland and forest	71.100.00	Coastal oak woodland	Not mapped	Coastal oak woodland	Mixed evergreen forest/oak woodland
Blue oak woodland	72.020.00	Blue oak woodland	Not mapped	Blue oak woodland	Blue oak woodland, oak savannah

Habitat Plan Land Cover Type	Manual of California Vegetation and CDFG Vegetation Code [1]	CWHR[2] Habitat Type	Coyote Ridge Vegetation Associations[3]	GAP Map—Santa Clara County	SFPUC Alameda Watershed HCP Land Cover Types[4]
Coast live oak forest and woodland	71.060.00	Coastal oak woodland	*Quercus agrifolia* alliance	Valley-foothill riparian	Central coast live oak riparian forest, coast live oak riparian forest, mixed evergreen forest/oak woodland
Foothill pine-oak woodland	87.130.05	Blue oak-foothill pine	Not mapped	Blue oak—foothill pine	Not mapped
Mixed evergreen forest	81.100.00	Montane hardwood-conifer	Not mapped	Montane hardwood-conifer	Mixed evergreen forest/oak woodland
Riparian Forest and Scrub					
Willow riparian forest and scrub	61.200.00 & 63.902.00	Valley-foothill riparian	Not mapped	Valley-foothill riparian	Central coast arroyo willow forest
Central California sycamore alluvial woodland	61.311.00	Valley-foothill riparian	*Platanus racemosa* alliance	Valley-foothill riparian	Sycamore alluvial woodland
Riverine	none	Riverine	Not mapped	Not mapped	Streams
Mixed riparian forest and woodland	61.900.00	Valley-Foothill Riparian	Not mapped	Not mapped	Not mapped
Conifer Woodland					
Redwood forest	86.100.00	Redwood	Not mapped	Redwood	Not mapped
Ponderosa pine woodland	87.010.00	Ponderosa pine	Not mapped	Ponderosa pine	Not mapped
Knobcone pine woodland	87.100.00	Closed-cone pine-cypress	Not mapped	Knobcone pine	Not mapped
Wetland					
Coastal and valley freshwater marsh	52.100.01	Fresh emergent wetland	Not mapped	Not mapped	Freshwater marsh
Seasonal wetlands	44.000.00	Fresh emergent wetland	*Juncus xiphioides* alliance (seasonal wetlands), *Phalaris aquatica* alliance (seasonal wetlands)	Not mapped	Not mapped

Habitat Plan Land Cover Type	Manual of California Vegetation and CDFG Vegetation Code [1]	CWHR[2] Habitat Type	Coyote Ridge Vegetation Associations[3]	GAP Map—Santa Clara County	SFPUC Alameda Watershed HCP Land Cover Types[4]
Open Water					
Pond (0.25-20 acres)	None	Lacustrine	Not mapped	Lacustrine	Pond or reservoir
Reservoir (defined by management)	None	Lacustrine	Not mapped	Lacustrine	Pond or reservoir
Agricultural					
Orchard	None	Orchard—vineyard	Not mapped	Orchard and vineyard	Cultivated agriculture
Vineyard	None	Orchard—vineyard	Not mapped	Orchard and vineyard	Cultivated agriculture
Grain, row-crop, hay and pasture, disked/short-term fallowed	None	Cropland	Not mapped	Cropland	Cultivated agriculture
Agriculture developed/Covered Ag	None	Urban	Not mapped	Urban	Not mapped
Developed					
Urban-Suburban	None	Urban	Not mapped	Urban	Developed
Rural—residential (<1 unit per 2.5 acres)	None	Urban	Not mapped	Residential	Developed
Golf courses / urban parks	None	Urban	Not mapped	Urban	Turf
Landfill	None	Urban	Not mapped	Other urban or built-upland	not mapped
Ornamental woodland	None	Eucalyptus, Urban	Not mapped	Groves	Developed
Barren	None	Urban	Not mapped	Barren	Developed

Notes:

1 Sawyer and Keeler Wolf 1995; California Department of Fish and Game 2003a.

2 CWHR= California Wildlife Habitat Relationships (Mayer and Laudenslayer 1988, 1999).

3 Evens and San 2004; plant species nomenclature follows that listed in Evens and San 2004.

4 This habitat conservation plan (Jones & Stokes 2005) is adjacent to the Santa Clara Valley Habitat Plan study area.

Table 3-3a. Counts of Polygons of Field-Checked Land Cover Types in Valley Floor[a]

	Field-Verified Land Cover Type (Corrected)																											
Mapped Land-Cover Type	California Annual Grassland	Serpentine Bunchgrass Grassland	Serpentine Rock/Outcrop	Rock Outcrop	Mixed Serpentine Chaparral	Northern Coastal Scrub/ Diablan Sage Scrub	Coyote Brush Scrub	Valley Oak Woodland	Mixed Oak Woodland and Forest	Blue Oak Woodland	Coast Live Oak Forest and Woodland	Foothill Pine-Oak Woodland	Willow Riparian Forest and Scrub	Mixed Riparian Forest and Woodland	Coastal and Valley Freshwater Marsh	Pond	Reservoir	Orchard	Vineyard	Grain, Row-Crop, Hay, Fallowed	Agriculture Developed	Urban/ Suburban	Barren	Rural Residential	Golf Courses/ Urban Parks	Landfill	Ornamental Woodland	Grand Total
California Annual Grassland	3																											**3**
Serpentine Bunchgrass Grassland	1	1																										**2**
Serpentine Rock Outcrop			1																									**1**
Rock Outcrop				3																								**3**
Northern Mixed Chaparral/Chamise Chaparral						1			1																			**2**
Mixed Serpentine Chaparral					2																							**2**
Coyote Brush Scrub							1																					**1**
Valley Oak/Grass								3																				**3**
Mixed Oak Woodland and Forest									7																			**7**
Blue Oak Woodland										6		1																**7**
Coast Live Oak Forest and Woodland									2		4																	**6**
Foothill Pine-Oak Woodland												1																**1**
Mixed Evergreen Forest									1		1																	**2**
Willow Riparian Forest and Scrub													1															**1**
Mixed Riparian Forest and Woodland								1	1					12														**14**
Ponderosa Pine Woodland										1																		**1**

	Field-Verified Land Cover Type (Corrected)																											
Mapped Land-Cover Type	California Annual Grassland	Serpentine Bunchgrass Grassland	Serpentine Rock/Outcrop	Rock Outcrop	Mixed Serpentine Chaparral	Northern Coastal Scrub/ Diablan Sage Scrub	Coyote Brush Scrub	Valley Oak Woodland	Mixed Oak Woodland and Forest	Blue Oak Woodland	Coast Live Oak Forest and Woodland	Foothill Pine-Oak Woodland	Willow Riparian Forest and Scrub	Mixed Riparian Forest and Woodland	Coastal and Valley Freshwater Marsh	Pond	Reservoir	Orchard	Vineyard	Grain, Row-Crop, Hay, Fallowed	Agriculture Developed	Urban/ Suburban	Barren	Rural Residential	Golf Courses/ Urban Parks	Landfill	Ornamental Woodland	Grand Total
Coastal and Valley Freshwater Marsh															1													**1**
Pond																1												**1**
Reservoir																	3											**3**
Orchard																		27	1	1			1				1	**31**
Vineyard	2																		18	4	1						1	**26**
Grain, Row-Crop, Hay, Fallowed	11																		1	14			1				3	**30**
Agriculture Developed																					27	8					2	**37**
Urban/Suburban																						28	1					**29**
Rural Residential																					2	1	27					**30**
Golf Courses/Urban Parks	2																					1		18			8	**29**
Landfill																								1	3		1	**5**
Ornamental Woodland											1															8		**9**
Barren																						2		1	2		14	**19**
Grand Total	**19**	**1**	**1**	**3**	**2**	**1**	**1**	**4**	**12**	**7**	**6**	**2**	**1**	**12**	**1**	**1**	**3**	**27**	**20**	**19**	**30**	**40**	**30**	**20**	**5**	**8**	**30**	**306**

[a] Entries in shaded cells in the diagonal indicate a match between the mapped and field-verified land cover type (i.e., a correct identification of land-cover type). Entries outside of the diagonal indicate an incorrect assignment.

Table 3-3b. Amounts of Field-Checked Land Cover Types (Acres) in Valley Floor[a]

	Field-Verified Land Cover Type (Corrected)																										
Mapped Land-Cover Type	California Annual Grassland	Serpentine Bunchgrass Grassland	Serpentine Rock/Outcrop	Rock Outcrop	Mixed Serpentine Chaparral	Northern Coastal Scrub/Diablan Sage Scrub	Coyote Brush Scrub	Valley Oak Woodland	Mixed Oak Woodland and Forest	Blue Oak Woodland	Coast Live Oak Forest and Woodland	Foothill Pine - Oak Woodland	Willow Riparian Forest and Scrub	Mixed Riparian Forest and Woodland	Coastal and Valley Freshwater Marsh	Pond	Reservoir	Orchard	Vineyard	Grain, Row-Crop, Hay, Fallowed	Agriculture Developed	Urban/Suburban	Rural Residential (<1 unit per 2.5 acres)	Golf Courses/Urban Parks	Landfill	Ornamental Woodland	Barren	Grand Total
California Annual Grassland	66																											**66**
Serpentine Bunchgrass Grassland	8	28																										**35**
Serpentine Rock Outcrop			1																									**1**
Rock Outcrop				2																								**2**
Northern Mixed Chaparral/ Chamise Chaparral						35			9																			**44**
Mixed Serpentine Chaparral					41																							**41**
Coyote Brush Scrub							20																					**20**
Valley Oak/Grass								73																				**73**
Mixed Oak Woodland and Forest									513																			**513**
Blue Oak Woodland										305		31																**336**
Coast Live Oak Forest and Woodland									88		151																	**238**
Foothill Pine-Oak Woodland												153																**153**
Mixed Evergreen Forest									314		151																	**466**
Willow Riparian Forest and Scrub													18															**18**
Mixed Riparian Forest and Woodland								11	5					123														**139**

Mapped Land-Cover Type	Field-Verified Land Cover Type (Corrected)																											
	California Annual Grassland	Serpentine Bunchgrass Grassland	Serpentine Rock/Outcrop	Rock Outcrop	Mixed Serpentine Chaparral	Northern Coastal Scrub/Diablan Sage Scrub	Coyote Brush Scrub	Valley Oak Woodland	Mixed Oak Woodland and Forest	Blue Oak Woodland	Coast Live Oak Forest and Woodland	Foothill Pine - Oak Woodland	Willow Riparian Forest and Scrub	Mixed Riparian Forest and Woodland	Coastal and Valley Freshwater Marsh	Pond	Reservoir	Orchard	Vineyard	Grain, Row-Crop, Hay, Fallowed	Agriculture Developed	Urban/Suburban	Rural Residential (<1 unit per 2.5 acres)	Golf Courses/Urban Parks	Landfill	Ornamental Woodland	Barren	Grand Total
Ponderosa Pine Woodland										1																		**1**
Coastal and Valley Freshwater Marsh															1													**1**
Pond																2												**2**
Reservoir																	320											**320**
Orchard																		724	19	19			14				12	**787**
Vineyard	29																		1,044	261	4						14	**1,352**
Grain, Row-Crop, Hay, Fallowed	770																		50	1,524			5				124	**2,473**
Agriculture Developed																					625	95					22	**742**
Urban/Suburban																						20,084	16					**20,099**
Rural Residential (<1 unit per 2.5 acres)																					10	10	1,238					**1,258**
Golf Courses/Urban Parks	76																					11		370			747	**1,204**
Landfill																								14	177		20	**211**
Ornamental Woodland											29															86		**115**
Barren																						42		77	109		318	**546**
Grand Total	**949**	**28**	**1**	**2**	**41**	**35**	**20**	**84**	**930**	**306**	**331**	**184**	**18**	**123**	**1**	**2**	**320**	**724**	**1,113**	**1,803**	**639**	**20,241**	**1,273**	**461**	**286**	**86**	**1,257**	**31,258**

[a] Entries in shaded cells in the diagonal indicate a match between the mapped and field-verified land cover type (i.e., a correct identification of land cover type). Entries outside of the diagonal indicate an incorrect assignment.

Table 3-4. Uncertainties in Land Cover Mapping, by Land Cover Type

Land Cover Type	Comment	General Mapping Confidence[1]
Grassland		
California annual grassland	Almost always has a distinct signature, may be difficult to distinguish from some seasonal wetlands.	High
Serpentine bunchgrass grassland	As for California annual grassland. Uncertainty lies with available serpentine soils and geology mapping, from which this land cover was derived (see text).	High
Serpentine rock outcrop	Likely under-mapped because outcrops are generally small and below the minimum mapping unit of 0.25 acres; outcrops below a chaparral or woodland canopy would be missed.	Low
Serpentine seep	Could be difficult to distinguish if seep is seasonal (i.e., not perennial) and therefore would appear similar to surrounding grasslands on December aerial photograph.	Moderate
Rock outcrop	As for serpentine rock outcrop.	Low
Chaparral and Northern Coastal Scrub		
Northern mixed chaparral /chamise chaparral	Generally quite distinct; the main issue in mapping was the distinction with adjacent mixed oak or foothill pine-oak;- there was often a gradation rather than a distinct difference in signatures among these land cover types. This occurred mainly in the northeast and east portions of the study area where chaparral on south-facing slopes graded into mixed-oak woodland in drainages and on north-facing slopes with intermediate areas of taller chaparral and lower-stature oak. At times it was difficult to judge the height of vegetation on slopes from the photos.	High
Mixed serpentine chaparral	Clear signature, mapped where serpentine soils/rocks intersected with chaparral signature.	High
Northern coastal scrub/Diablan sage scrub	Northern coastal scrub dominated by California sagebrush had a distinctive pale green signature, but coastal scrub dominated by black sage appeared dark green and was similar in hue to chamise and to some of the components of mixed chaparral.	High
Coyote brush scrub	Dark green signature was similar to chamise and black sage; landscape position aided in distinguishing this uncommon type in the plan area.	Moderate
Oak Woodland		
Valley oak woodland	Main issue in mapping was distinguishing valley oak woodland from blue oak woodland. Valley oak trees typically appeared large-crowned, well-spaced, grayish (leafless) on the March 2003 photo, and were located on either broad ridge tops and shoulders or broad valley bottoms. Blue oak trees typically appeared smaller-crowned, closer-spaced, were beginning to leaf out in the March photos (earlier than valley oak), and were located on steeper, south, southwest, or southeast-facing slopes. Trees that appear intermediate in any of those characters were more difficult to classify, so large well-spaced blue oaks, denser stands of small-crowned valley oak, and blue oaks on valley bottoms were more likely to be mis-classified.	Moderate
Mixed oak woodland and forest	This type was characterized by a mix of deciduous and evergreen oaks; the two could be distinguished on the December 2003 or 2005 photographs when the deciduous trees were leafless; on the March 2003 photo, when the deciduous trees were in leaf, Mixed oak appeared similar to Coast live oak woodland. Because this type generally graded into the adjacent types with no clear distinction, the main issue was deciding where to separate the different types. Topography was helpful.	Moderate

Land Cover Type	Comment	General Mapping Confidence[1]
Blue oak woodland	See comments under Valley oak woodland. Blue oak woodland is much more abundant than Valley oak woodland, so errors in attributes would have greater effects on the Valley oak woodland land cover type than blue oak woodland.	High
Coast live oak forest and woodland	See comments under Mixed oak woodland and forest	Moderate
Foothill pine—oak woodland	The signature of foothill pine was usually distinctive. As discussed above, this type could grade into chaparral. December photos were taken at a time of day with pronounced shadows, which made isolated trees such as foothill pine easy to identify.	High
Mixed evergreen forest	Difficult to distinguish from Coast live oak woodland as both types are closed-canopy woodlands with similar dark green signatures. Geographic location was helpful – mixed evergreen occurred on the west side of the valley, while coast live oak woodland occurred throughout the plan area. Topography was somewhat useful – although both types occurred on north-facing slopes, Mixed evergreen was often in mid-slope positions while Coast live oak tended to be on the lower slopes.	Moderate
Riparian Forest and Scrub		
Willow riparian forest and scrub	Distinguished from Mixed riparian woodland by generally smaller stature trees and by the bright yellow appearance of small willows that retained their leaves into December; generally dominated by willow and lacking other species, such as bay and coast live oak, that would appear green in December photo, and alder, cottonwood, and valley oak, that would appear leafless in December. This type graded into Mixed riparian woodland, however, without a distinct boundary	Moderate-High
Central California sycamore alluvial woodland	Mature stands of sycamore had a distinctive signature in the December aerial, with the well-spaced large pale grayish crowns surrounded by a 'halo' of golden-yellow fallen leaves. Main difficulty in mapping was with large well-spaced cottonwood trees, which could appear similar to large sycamores, although the canopy was generally smaller. Land cover mapping for the HCP/NCCP was compared to field-based mapping conducted by CDFG (Keeler-Wolf et al. 1997) and found to be generally consistent (see text for more discussion).	Moderate-High
Mixed riparian forest and woodland	See comments under Willow riparian forest and scrub	Moderate-High
Riverine	Not mapped; using linear data sets provided by SCVWD.	N/A
Conifer Woodland		
Redwood forest	Mature redwood canopies were readily distinguishable; main confusion would be with Douglas-fir, which fieldwork revealed to be relatively uncommon (no large stands were observed); areas with regenerating redwoods could be confused with mixed evergreen forest.	Moderate-High
Ponderosa pine woodland	Very clear signature and restricted geographic distribution in the plan area made this a distinct type: ponderosa pine occurs on just 3 ridges with widely scattered tall trees casting distinctive long shadows on the surrounding grassland. However, small stands of ponderosa pine also occurred in some of the valley below the ridges, where they could be difficult to distinguish from the surrounding evergreen oak crowns.	High
Knobcone pine woodland	Restricted geographic and topographic distribution in the Plan but lacking a distinctive signature, mostly identified on the basis of geographic and topographic location (ridgetops in the extreme west of the plan area).	High

Table 3-4. Continued

Land Cover Type	Comment	General Mapping Confidence[1]
Wetland		
Coastal and valley freshwater marsh	Generally had a distinct signature. Some freshwater marshes may have been below the minimum mapping unit of 0.25 acres. Photos from three seasons (winter 2003 and 2005, spring 2003) ensured that conditions were favorable to perennial marsh on one or more air photos.	Moderate
Seasonal wetlands	Color differences in seasonal wetlands were difficult to distinguish from a variety of surrounding land cover types, and resulted in a very small acreage of this land cover in the first draft of the maps. Many seasonal wetlands may occur at a scale below the minimum mapping unit of 0.25 acres. Subsequent mapping of seasonal wetlands using additional data sources (e.g., Coyote Valley Specific Plan and National Wetland Inventory data) have resolved some of the mapping uncertainties.	Low (Moderate[2])
Open Water (Aquatic)		
Pond	Distinctive; main issue was visibility because of heavy shadows on the December photo when ponds were full.	High
Reservoir	Large, highly distinctive.	High
Irrigated Agriculture		
Orchard	Distinctive regular pattern of tree crowns; recently planted orchards could be confused with disked or fallow fields if the small trees were too small to be visible.	High[3]
Vineyard	Generally distinctive because of the narrow rows; recently planted vineyards could be confused with disked or fallow fields because the small vines were too small to be visible	High[3]
Agriculture developed	Distinctive	High[3]
Grain, row-crop, hay and pasture, disked/ short-term fallowed	Distinctive; the main issue was more associated with the definition rather than recognition and was related to the separation of annual grassland and short-term fallow	High[3]
Developed		
Urban-Suburban	Distinctive	High[3]
Rural residential (<1 unit per 2.5 acres)	Distinctive	High[3]
Golf courses/Urban parks	Distinctive	High[3]
Landfill	Distinctive	High[3]
Ornamental woodland	Generally distinctive based on location and patterning of the tree crowns; many stands below minimum mapping unit of 10 acres but this is generally not important for the covered species.	Moderate[3]
Barren	Distinctive	High[3]

Notes:

1 Qualitative confidence in mapping in terms of accuracy of polygon boundaries, polygon attributes, and the extent of the land cover type in the study area (i.e., over- or under-mapped).

2 With supplemental mapping using additional data sets (see text under *Seasonal Wetlands*).

3 See text and Tables 3-3a and 3-3b for quantitative error checking of agricultural and urban land-cover types. Quantitative error checking of natural land-cover types was not feasible.

Table 3-5. Covered Wildlife Species and Their Associated Land Cover Types

		Covered Species								
		Invertebrate	Amphibians				Birds			Mammals
Natural Community	Land Cover Type	Bay checkerspot butterfly *Euphydryas editha bayensis*	California tiger salamander *Ambystoma californiense*	California red-legged frog *Rana draytoni*	Foothill yellow-legged frog *Rana boylii*	Western pond turtle *Clemmys marmorata*	Western burrowing owl *Athene cunicularia hypugea*	Least Bell's vireo *Vireo bellii pusillus*	Tricolored blackbird *Agelaius tricolor*	San Joaquin kit fox *Vulpes macrotis mutica*
Grasslands										
	California annual grassland	M	U,M	U,M		M	F,B		Y	M,F
	Non-serpentine native grassland (not mapped)	M	U,M	U,M		M	F,B		Y	M,F
	Serpentine bunchgrass grassland	Y	U,M	U,M		M	F		Y	M,F
	Serpentine rock outcrop/Barren	M	M	M						M,F
	Serpentine seep	M	U,M	M		M				M,F
	Rock outcrop	M								M,F
Chaparral and Coastal Scrub										
	Northern mixed chaparral/ chamise chaparral		U,M	M		M				
	Mixed serpentine chaparral	M	U,M	M		M				
	Northern coastal scrub/ Diablan sage scrub	M	U,M	M		M				
	Coyote brush scrub	M	U,M	M		M				
Oak Woodland										
	Valley oak woodland	M	U,M	M		M	F,M		Y	M,F
	Mixed oak woodland and forest		U,M	M		M				M
	Blue oak woodland	M	U,M	M		M				M
	Coast live oak forest and woodland	M	U,M	M		M				M
	Foothill pine—oak woodland		U,M	M		M				
	Mixed evergreen forest					M				
Riparian Forest and Scrub										
	Willow riparian forests and scrub	M	M	Y	M,F	Y		F, B	B	M
	Central California sycamore alluvial woodland		M	Y	M,F	Y		F, B	Y	M
	Mixed riparian forest and woodland	M	M	Y	M,F	Y		F,B	Y	M
Conifer Woodland										
	Redwood forest			M	M,F	Y				
	Ponderosa pine woodland		M	M		M				
	Knobcone pine woodland			M		M				

Key: U = Upland habitat; B = Breeding habitat; F = Foraging habitat; M = Movement habitat; Y = Year-round habitat (includes breeding)

Natural Community	Land Cover Type	Covered Species								
		Invertebrate	Amphibians				Birds			Mammals
		Bay checkerspot butterfly *Euphydryas editha bayensis*	California tiger salamander *Ambystoma californiense*	California red-legged frog *Rana draytoni*	Foothill yellow-legged frog *Rana boylii*	Western pond turtle *Clemmys marmorata*	Western burrowing owl *Athene cunicularia hypugea*	Least Bell's vireo *Vireo bellii pusillus*	Tricolored blackbird *Agelaius tricolor*	San Joaquin kit fox *Vulpes macrotis mutica*
Wetland										
	Coastal and valley freshwater marsh	M	B,F	Y		Y			F,B	
	Seasonal wetland	M	B,F	B,F		F	M		F,B	M
Open Water										
	Pond	M	B,F	Y		Y			F,B	
	Reservoir					Y			F,B	
	Riverine	M	B,F, M	Y	Y	Y				
Agricultural										
	Orchard	M	M	M			F, M		F	M,F
	Vineyard	M	M	M					F	M
	Grain, row-crop, hay and pasture, disked/short-term fallowed	M	M	M		M	F,B, M		F,B	M,F
	Agriculture developed	M					F,M		F	M
Developed										
	Urban-suburban	M								
	Rural–residential	M		M		M	F, B		F	M
	Golf courses / urban parks	M	M	M		M	F, B		F	M
	Landfill	M								
	Barren	M	M	M		M	F, B		F	M,F

Key: U = Upland habitat; B = Breeding habitat; F = Foraging habitat; M = Movement habitat; Y = Year-round habitat (includes breeding)

Table 3-6. Covered Plant Species and Land Cover Types

Natural Community	Land Cover Type	Tiburon Indian paintbrush *Castilleja affinis* ssp. *neglecta*	Coyote ceanothus *Ceanothus ferrisiae*	Mount Hamilton thistle *Cirsium fontinale* var. *campylon*	Santa Clara Valley dudleya *Dudleya abramsii* ssp. *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*
Grasslands										
	California annual grassland					S				
	Non-serpentine native grassland (not mapped)									
	Serpentine bunchgrass grassland	P	P	P[1]	P	P		P	P	P
	Serpentine rock outcrop/Barren	P			P			P	P	P
	Serpentine seep			P						
	Rock outcrop									S
Chaparral and Coastal Scrub										
	Northern mixed chaparral/ chamise chaparral						S			
	Mixed serpentine chaparral		P				S			P
	Northern coastal scrub/ Diablan sage scrub					S				S
	Coyote brush scrub									
Oak Woodland										
	Valley oak woodland				P[2]	S				
	Mixed oak woodland and forest				P[2]	S	P			
	Blue oak woodland					S				
	Coast live oak forest and woodland				P[2]	S	P			
	Foothill pine—oak woodland					S				
	Mixed evergreen forest					S				

Key: P = Primary habitat (most likely to occur); S = Secondary habitat (unlikely but possible to occur); ? = may occur but data from study area is lacking.

Natural Community	Land Cover Type	Tiburon Indian paintbrush *Castilleja affinis* ssp. *neglecta*	Coyote ceanothus *Ceanothus ferrisiae*	Mount Hamilton thistle *Cirsium fontinale* var. *campylon*	Santa Clara Valley dudleya *Dudleya abramsii* ssp. *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*
Riparian Forest and Scrub										
	Willow riparian forests and scrub									
	Central California sycamore alluvial woodland									
	Mixed riparian forest and woodland									
Conifer Woodland										
	Redwood forest					?				
	Ponderosa pine woodland									
	Knobcone pine woodland					?				
Wetland										
	Coastal and valley freshwater marsh									
	Seasonal wetland					?				
Open Water										
	Pond									
	Reservoir									
	Riverine									
Agricultural										
	Orchard									
	Vineyard									
	Grain, row-crop, hay and pasture, disked/ short-term fallowed									
	Agriculture developed									

Key: P = Primary habitat (most likely to occur); S = Secondary habitat (unlikely but possible to occur); ? = may occur but data from study area is lacking.

Natural Community	Land Cover Type	Tiburon Indian paintbrush *Castilleja affinis* ssp. *neglecta*	Coyote ceanothus *Ceanothus ferrisiae*	Mount Hamilton thistle *Cirsium fontinale* var. *campylon*	Santa Clara Valley dudleya *Dudleya abramsii* ssp. *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*
Developed										
	Urban-suburban									
	Rural–residential									
	Golf courses / urban parks									
	Landfill									
	Barren									

Key: P = Primary habitat (most likely to occur); S = Secondary habitat (unlikely but possible to occur); ? = may occur but data from study area is lacking.

Table 3-7. Land Cover Types and their Extent in the Study Area

Vegetation Type	# of Polygons	Acres	Percent of Study Area
Grasslands			
California annual grassland	937	81,795	18
Non-serpentine native grassland (not mapped)	N/A	N/A	N/A
Serpentine bunchgrass grassland	329	10,308	2.2
Serpentine rock outcrop	136	260	0.05
Serpentine seep	40	34	0.01
Rock outcrop	80	87	0.02
Chaparral and Coastal Scrub			
Northern mixed chaparral / chamise chaparral	400	23,763	5.2
Mixed serpentine chaparral	181	3,712	0.8
Northern coastal scrub / Diablan sage scrub	486	10,306	2.2
Coyote brush scrub	12	180	0.04
Oak Woodland			
Valley oak woodland	393	12,895	2.8
Mixed oak woodland and forest	609	84,488	18.4
Coast live oak woodland and forest	376	31,652	6.9
Blue oak woodland	296	11,160	2.4
Foothill pine - oak woodland	190	10,960	2.4
Mixed evergreen forest	58	5,775	1.3
Riparian Forest and Scrub			
Willow riparian forest, woodland and scrub	293	2,544	0.6
Central California sycamore alluvial woodland	14	373	0.1
Mixed riparian woodland and forest	356	3,766	0.8
Riverine (streams, in miles; see text for data source)	N/A	2,392	N/A
Conifer Woodland			
Redwood forest	23	9,693	2.1
Ponderosa pine woodland	10	419	0.1
Knobcone pine woodland	11	711	0.1
Wetland			
Coastal and valley freshwater marsh	79	381	0.1
Seasonal wetland	135	201	0.04
Open Water (Aquatic)[1]			
Pond	689	1,1105	0.2
Reservoir	16	2,767	0.6
Agricultural			
Orchard	96	2,697	0.6
Vineyard	34	1,393	0.3
Agriculture developed / covered agriculture	1047	1,935	0.4
Grain, row-crop, hay and pasture, disked/short-term fallowed	328	33,648	7.3

Table 3-7. Continued

Vegetation Type	# of Polygons	Acres	Percent of Study Area
Developed			
Urban-suburban	183	89,438	19.4
Rural – residential	362	12,414	2.7
Barren	6	211	0.05
Landfill	4	364	0.02
Golf courses / urban parks	293	8,673	1.9
Ornamental woodland	9	95	0.02
Total	**7,571**	**460,205**	**100.0**

[1] The number of polygons identified for each open water land cover is equal to the total number of open water bodies (e.g., 689 polygons for the pond land cover indicates there are 689 mapped ponds in the study area).

Table 3-8. Native Fish and Amphibian Species in Relation to Fish Communities in Santa Clara County Streams

	Fish Community						
Species	Cold Trout	Cold Steelhead	Warm Potential Trout/ Steelhead	Warm Native	Mixed Salmon	Mixed Native and Introduced	Fish Scarce
Resident trout	X						
Steelhead trout		X	(x)				X (migration)
Chinook salmon		(x)	(x)		X		(x) (migration)
Riffle sculpin	X	X					
Sucker	(x)	X	X	X	X	X	
Lamprey	(x)	X	X	(x)	X	(x)	X (migration)
Roach	(x)	X	X	X	X		
Pikeminnow		(x)	X	X			
Prickly sculpin			X	X	X		
Hitch			(x)	X	X		
Blackfish						X	
Tule perch						(x)	
Nonnatives Common					X	X	
California red-legged frog	X	X	(x)	(x)			
Foothill yellow-legged frog	X	(x)		X			
Western toad				X	(x)	(x)	(x)

Notes:
X = habitats commonly or reliably occupied.
(x) = habitats occupied intermittently or at low densities.
See Chapter 3 for definitions of fish communities and **Figure 3-11** for locations.
Source: Habitat Plan Science Advisors Report (Spencer et al. 2006).

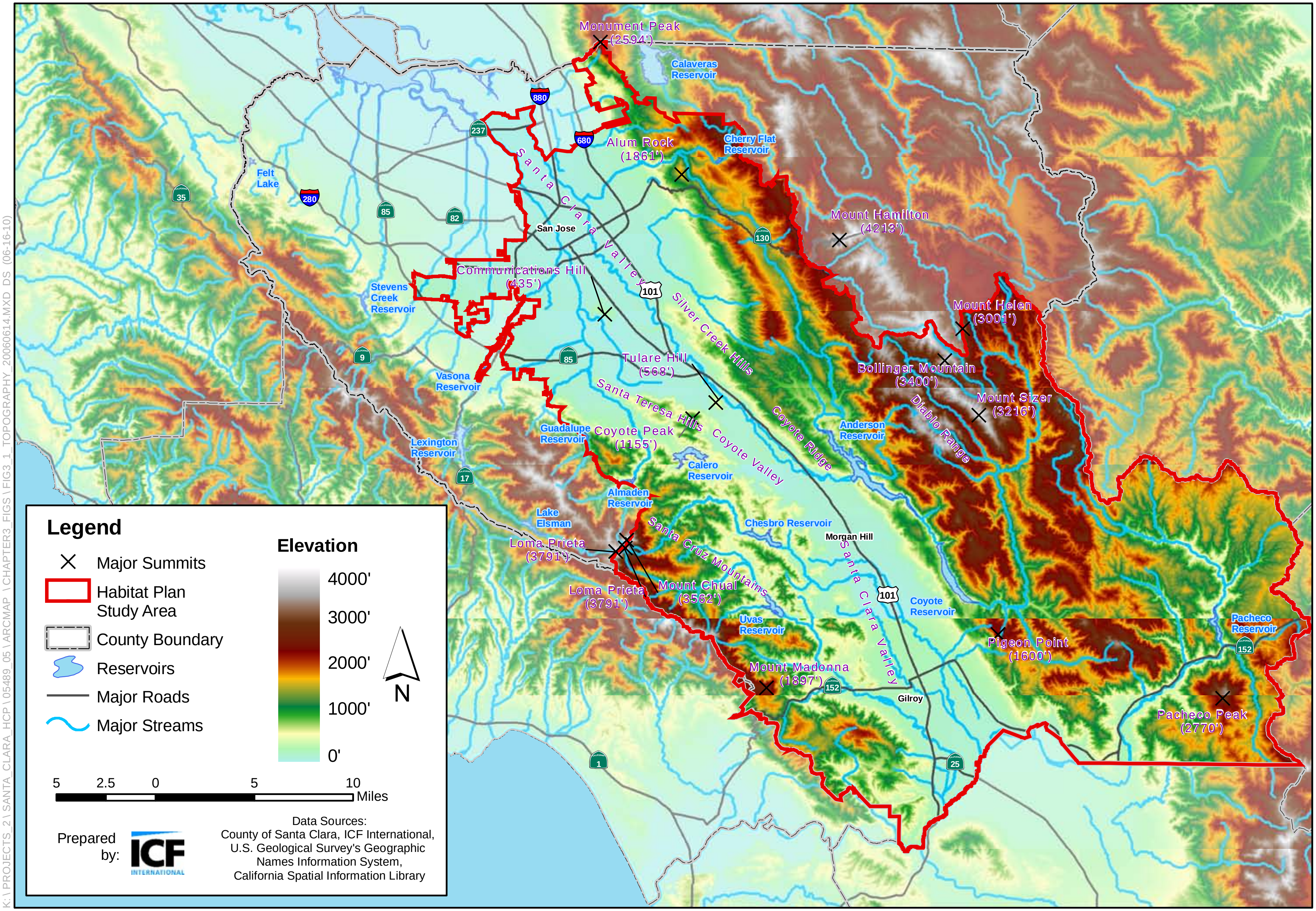

Figure 3-1
Santa Clara Valley HCP/NCCP Topography

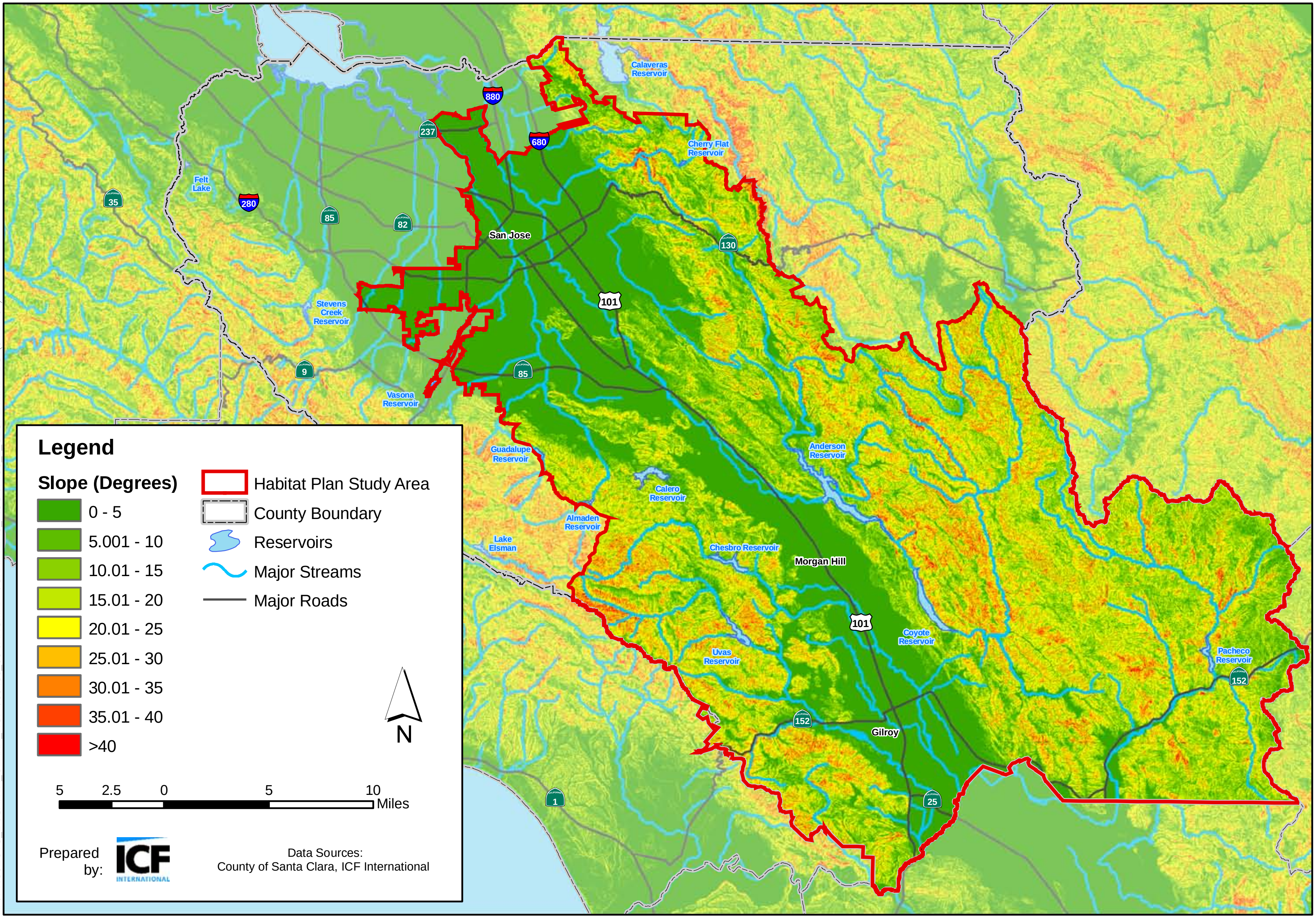

Figure 3-2
Santa Clara Valley HCP/NCCP Slope in Degrees

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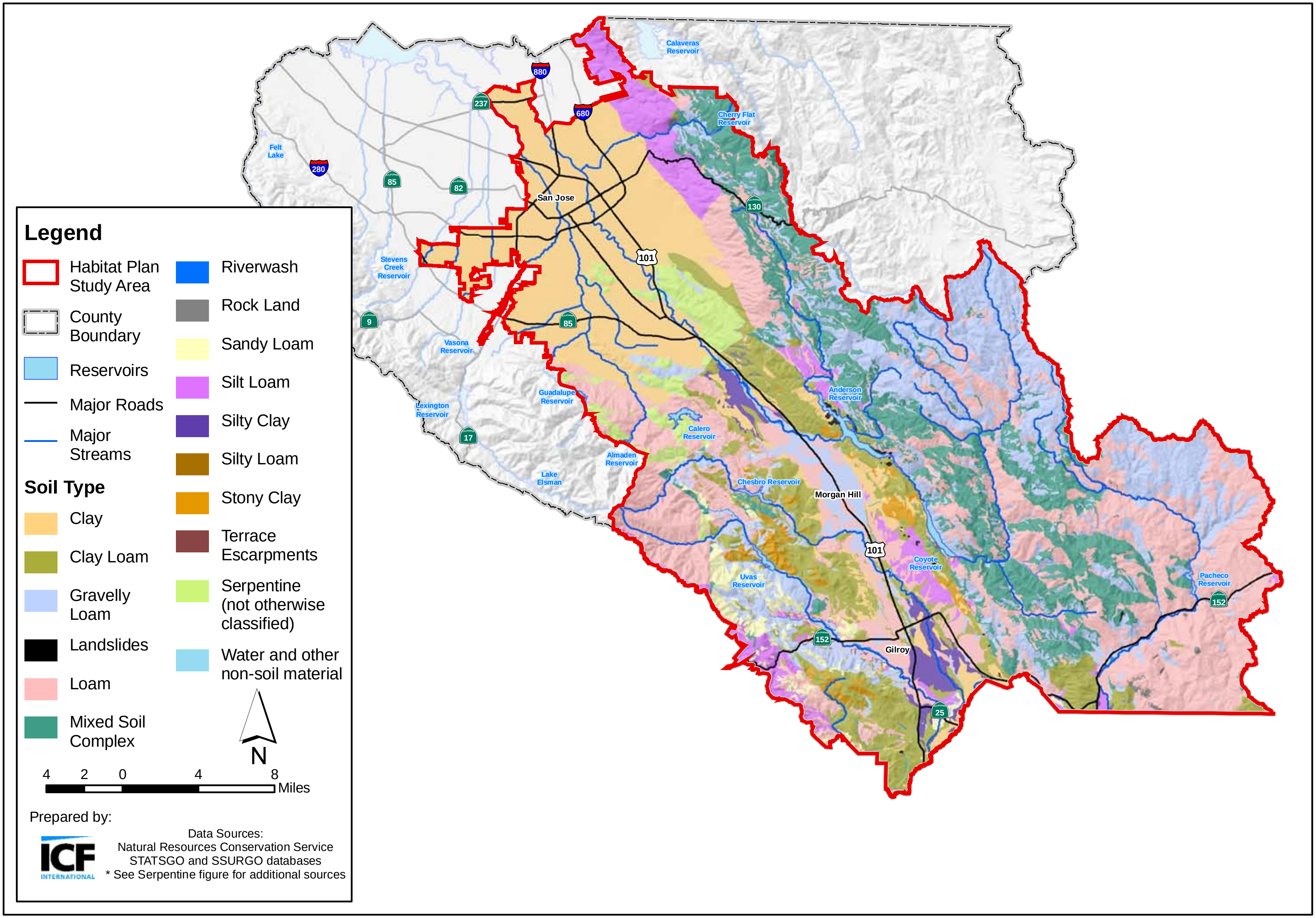

Figure 3-3
Soils in the Santa Clara Valley HCP/NCCP Area

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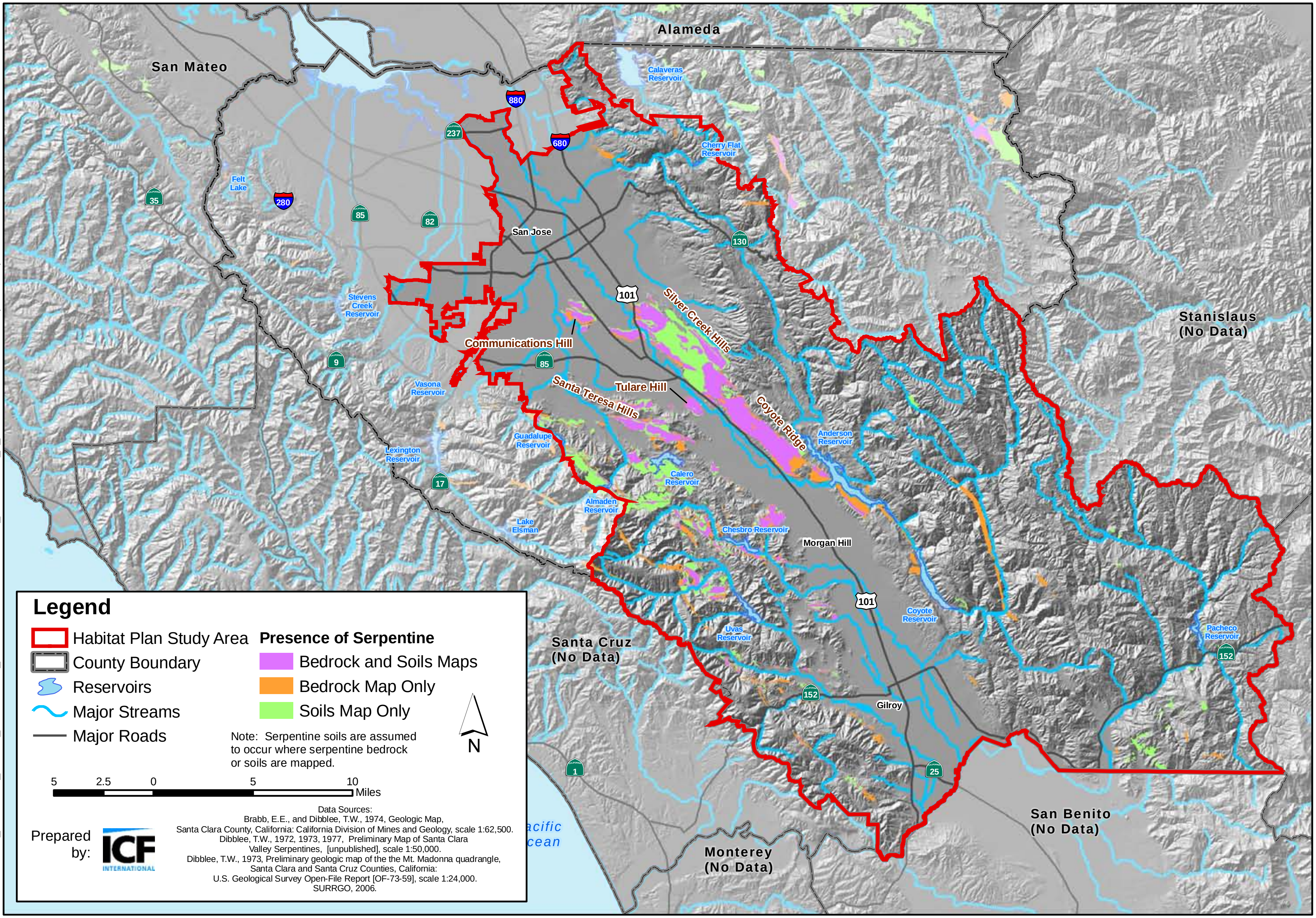

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Figure 3-4
Santa Clara Valley HCP/NCCP Serpentine Areas

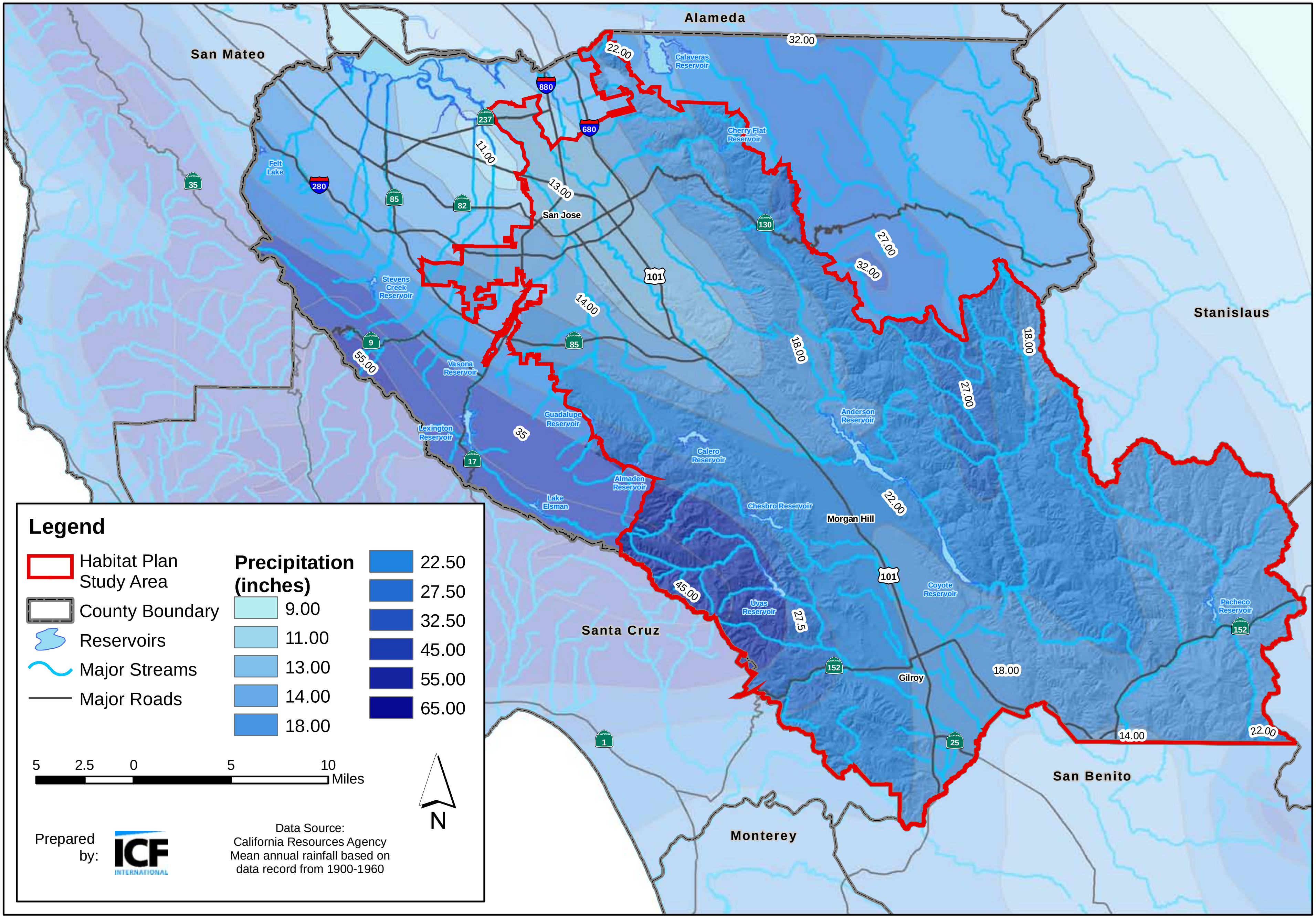


Figure 3-5
Average Annual Rainfall in HCP/NCCP Study Area

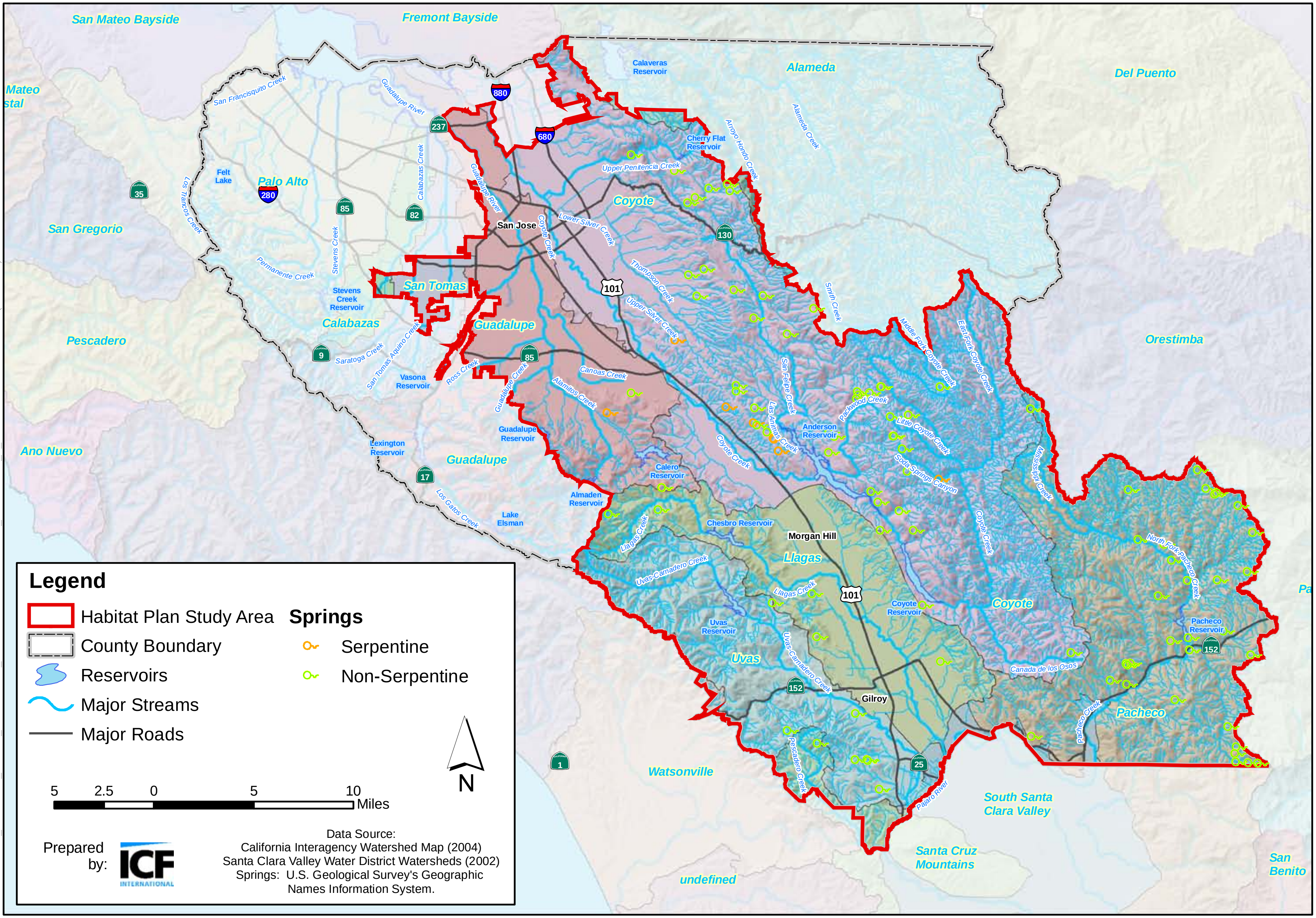
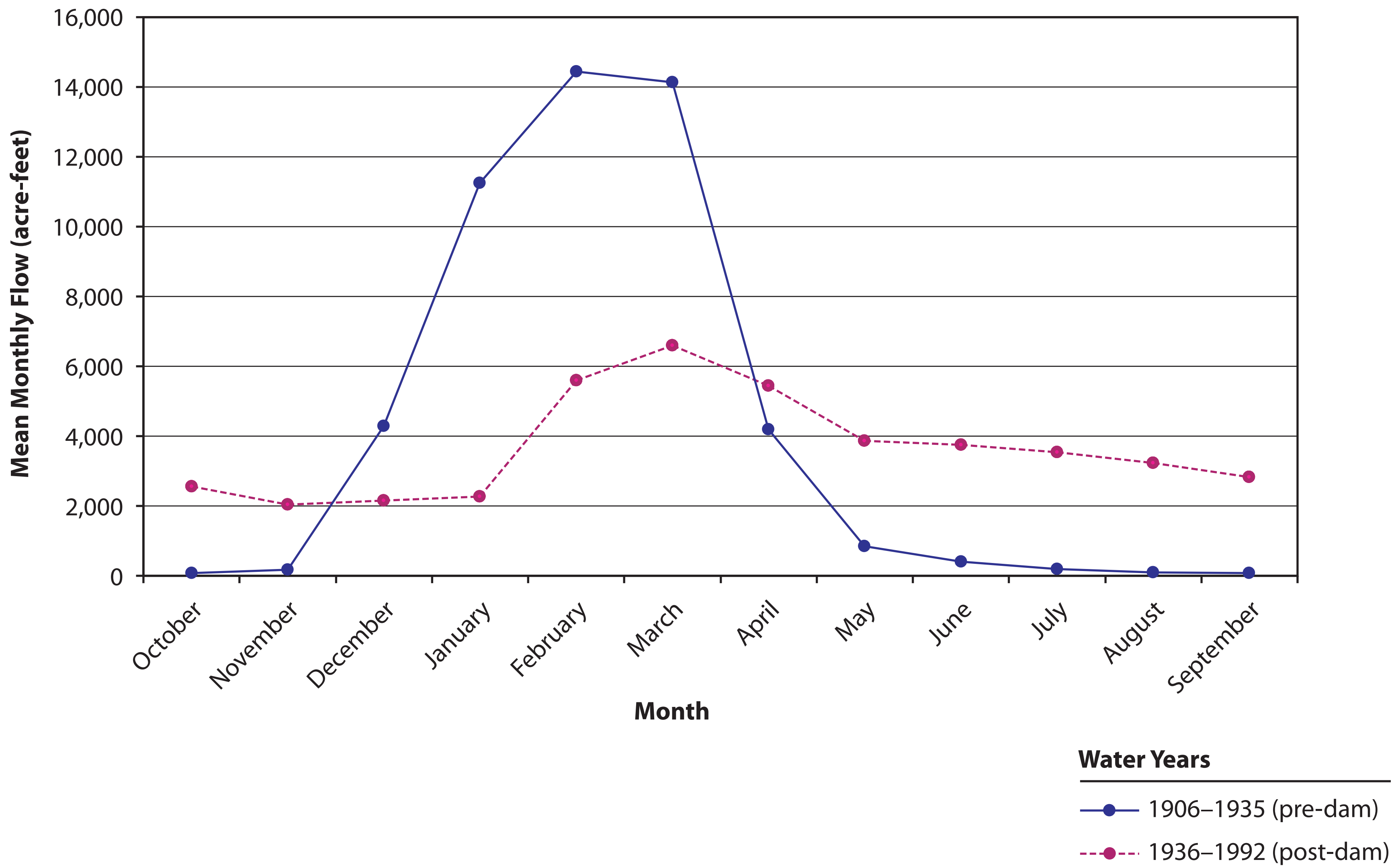


Figure 3-6
Santa Clara Valley HCP/NCCP Watersheds



Source: California Department of Water Resources 2006.
Available: http://cdec.water.ca.gov/cgi-progs/selectQuery?station_id=cyo&sensor_num=&dur_code=M&start_date=01%2F01%2F1901&end_date=now. Accessed: September 13, 2006.

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Figure 3-7
Coyote Creek Historic and Current Mean Monthly Flows below Anderson Dam

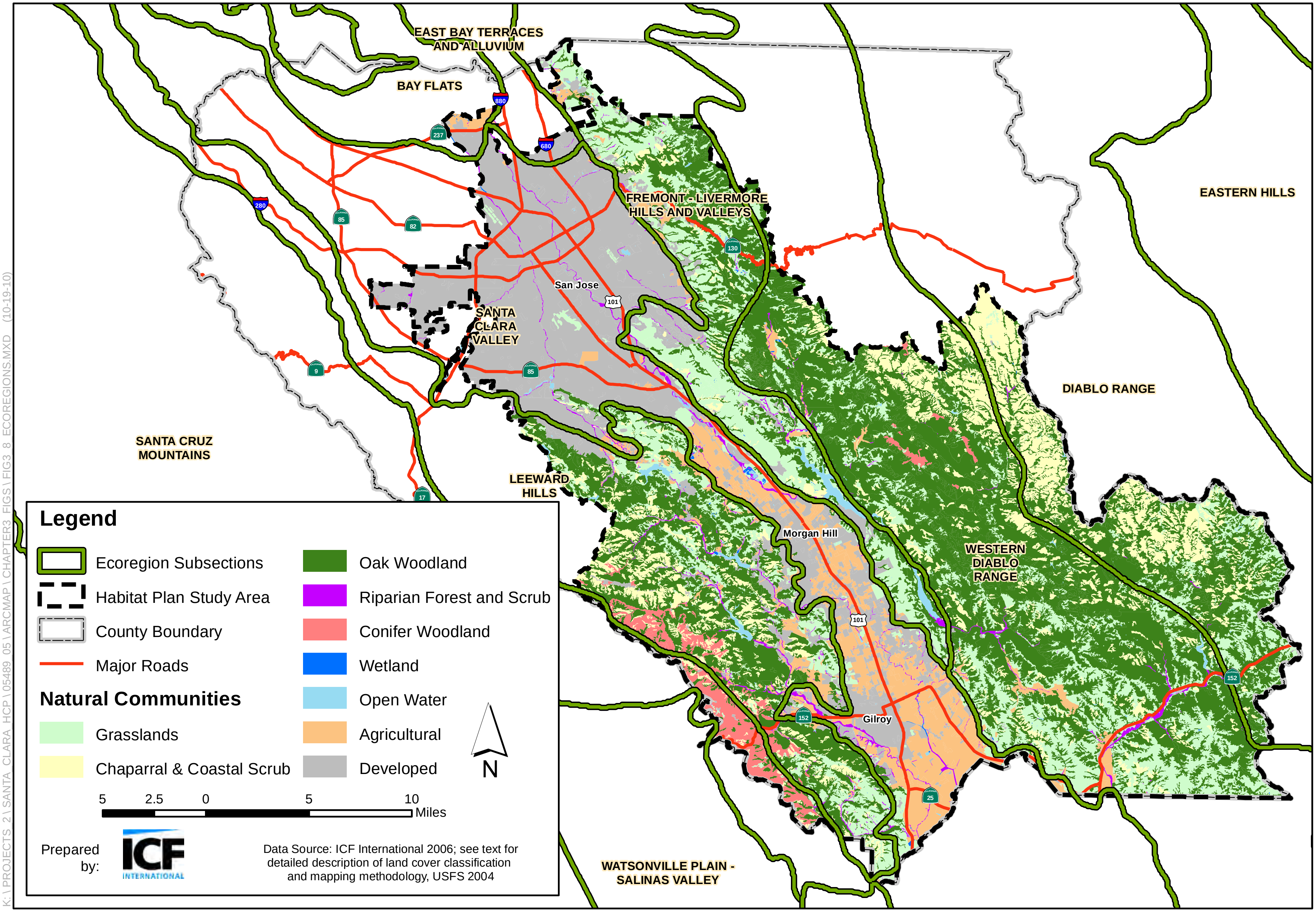

Figure 3-8
Santa Clara Valley Habitat Plan Natural Communities and USDA Ecoregion Subsections

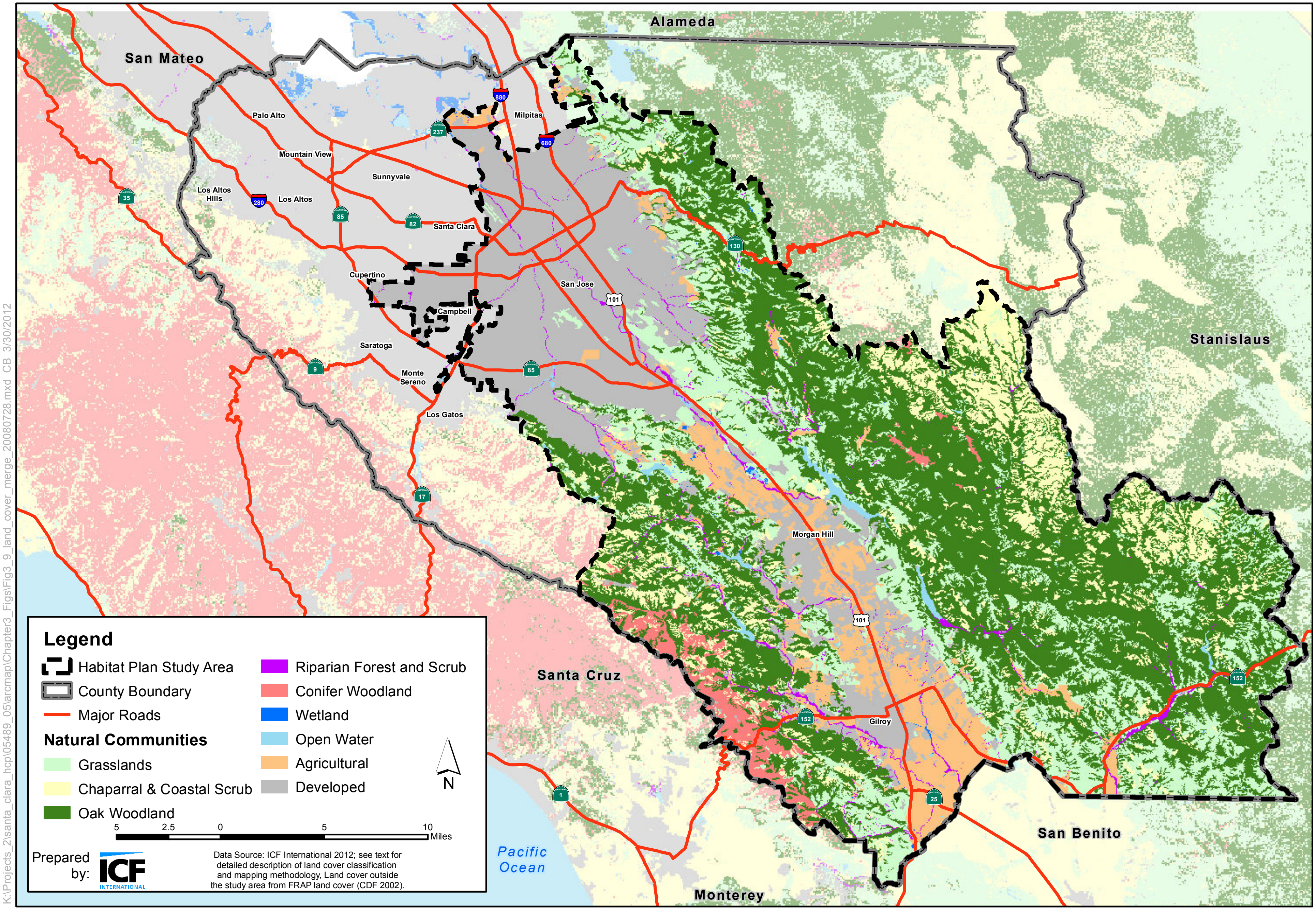

Figure 3-9
Santa Clara Valley Habitat Plan Natural Communities

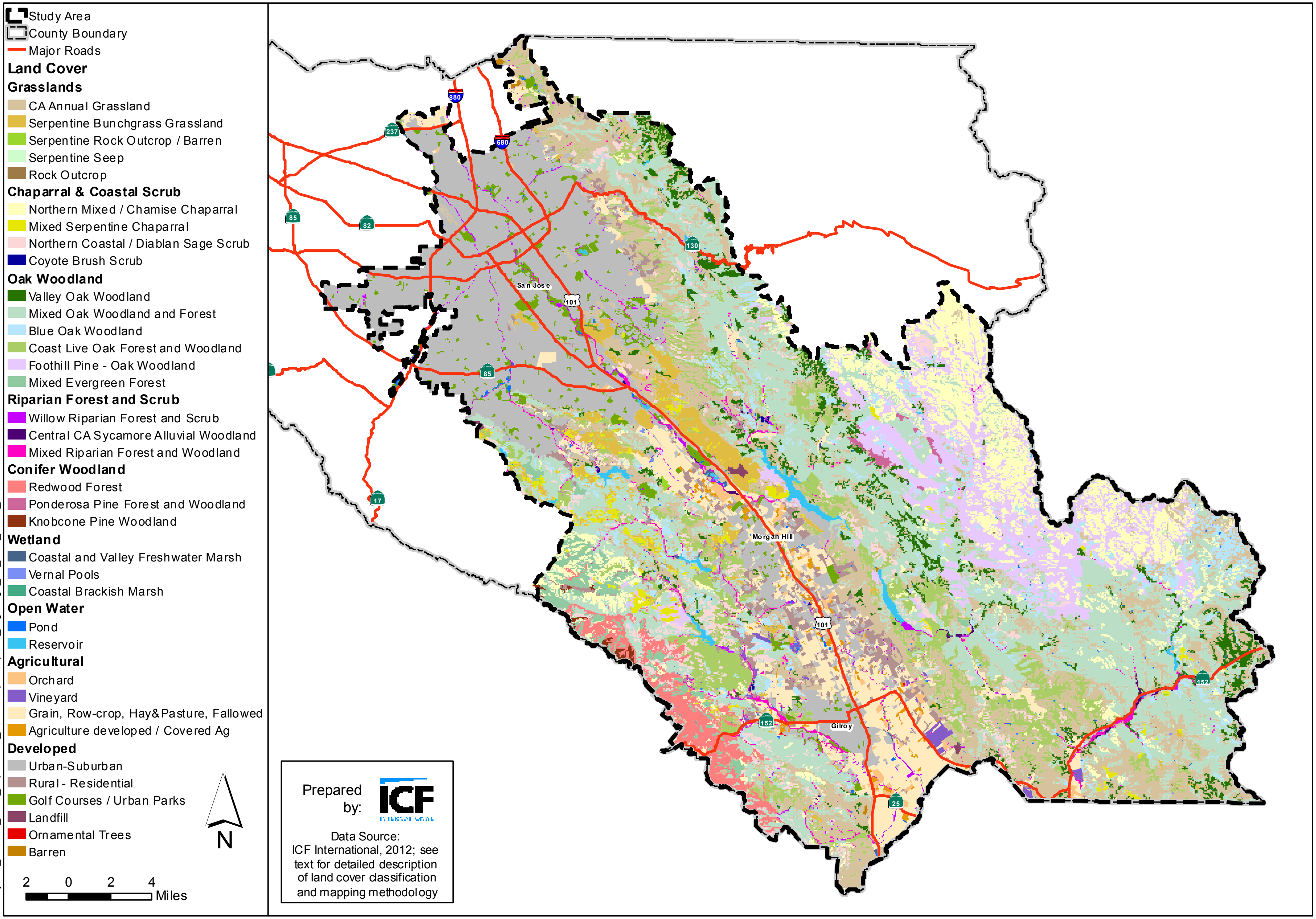

Figure 3-10
Santa Clara Valley Habitat Plan Land Cover

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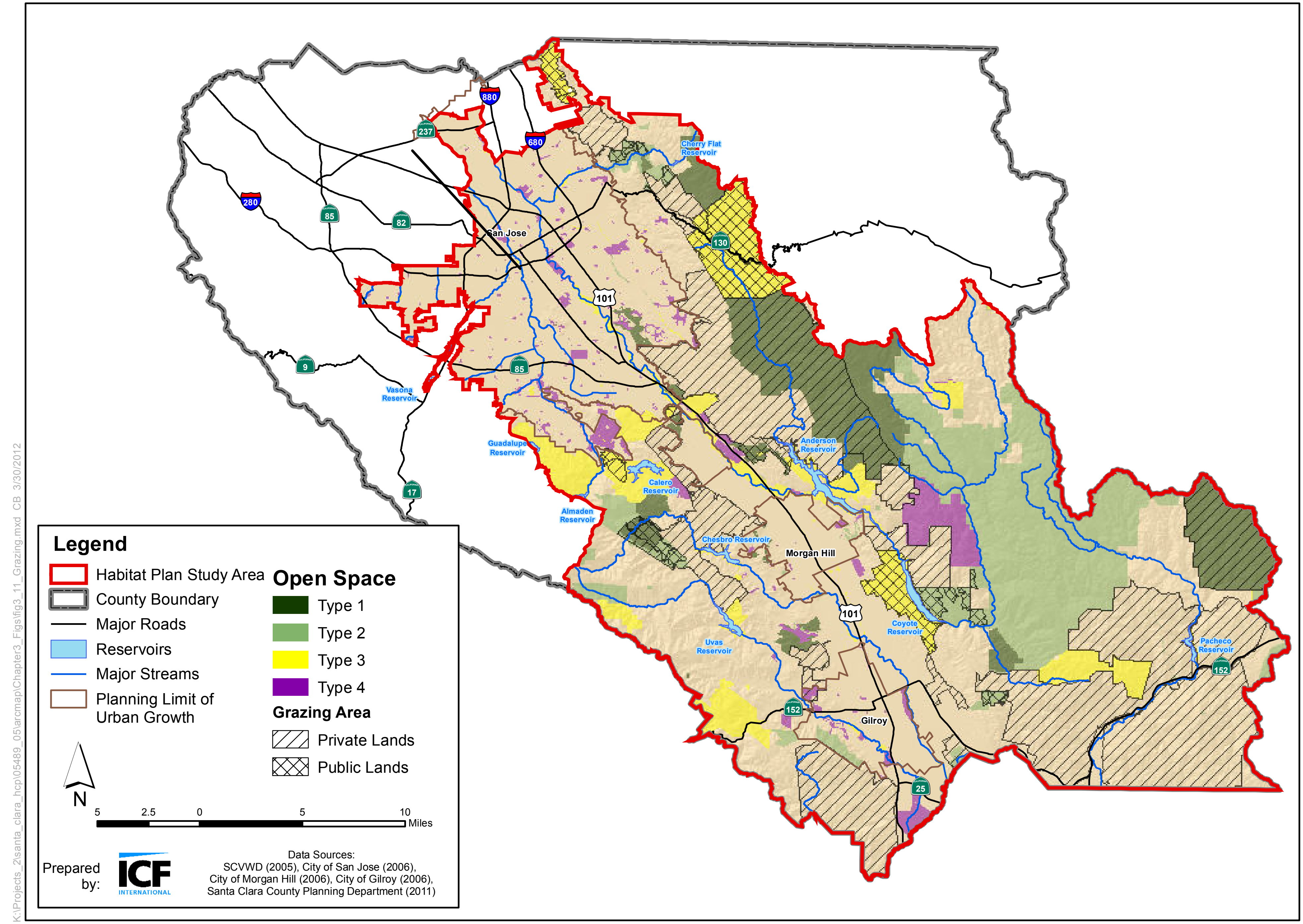

Figure 3-11
Extent of Grazing in the Study Area

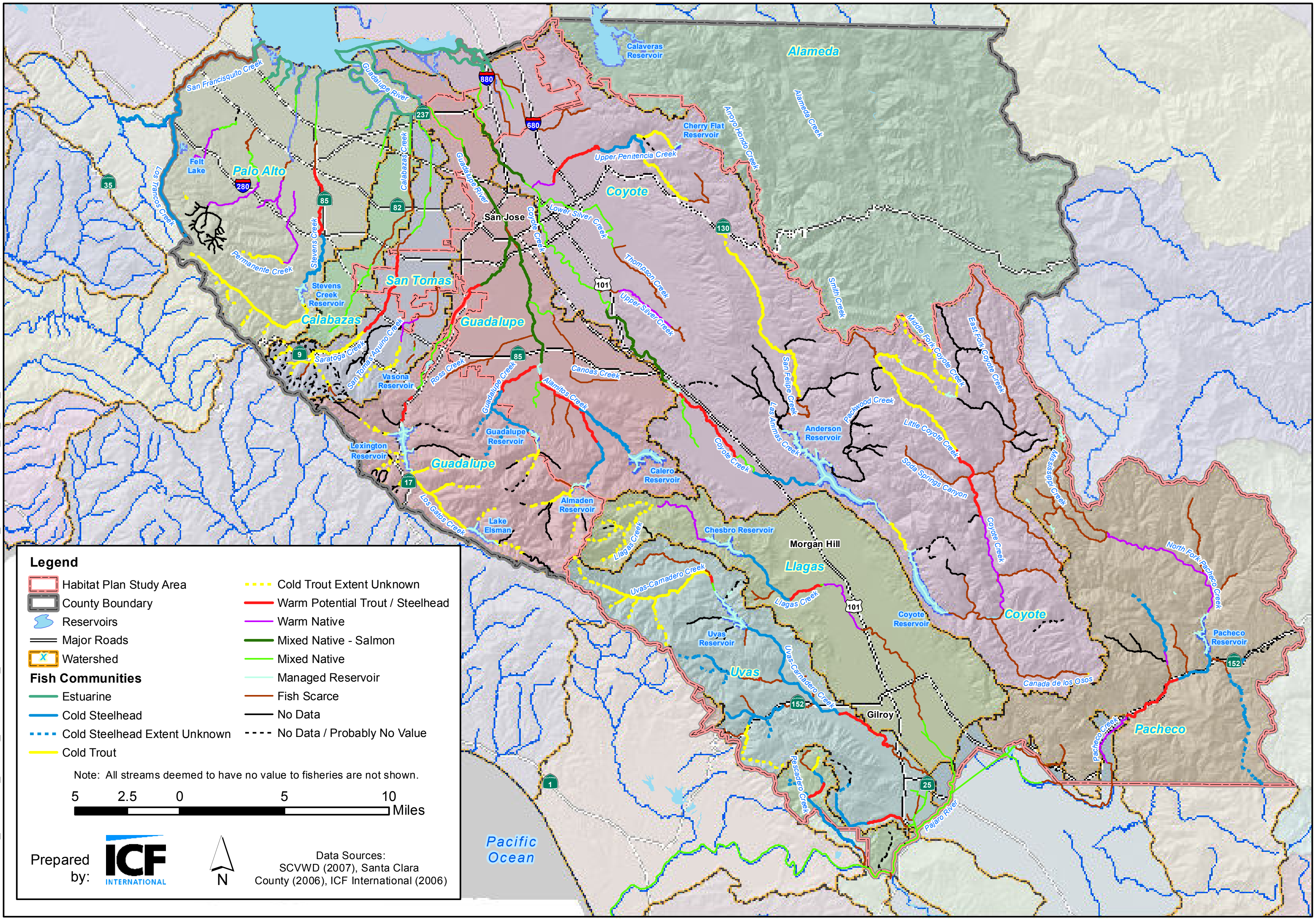

Figure 3-12
Fish Communities in the Study Area

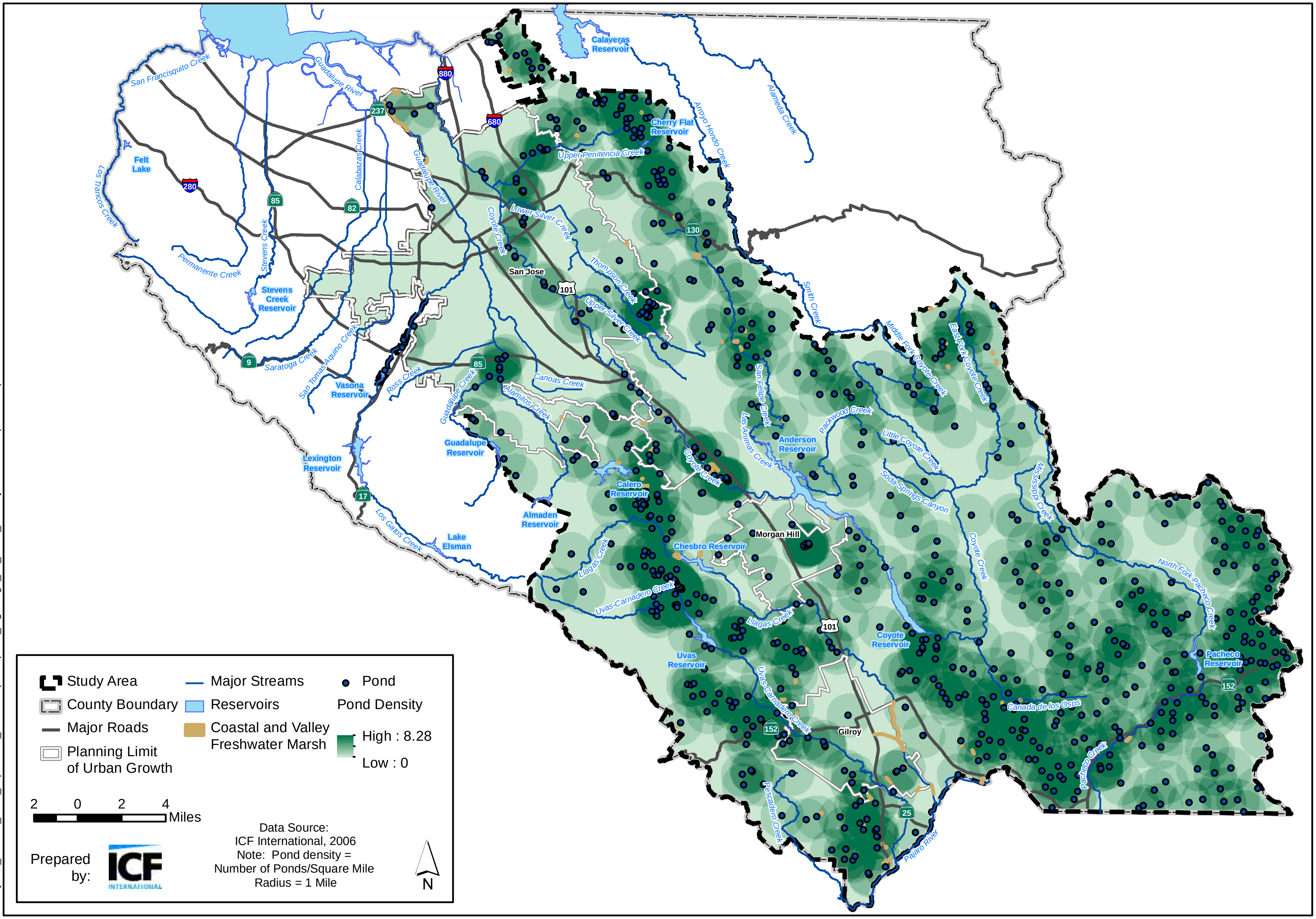

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Figure 3-13
Pond Density in the Study Area