PROGRAMMATIC BIOLOGICAL OPINION

FOR THE

EAST ALAMEDA COUNTY CONSERVATION STRATEGY

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
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In Reply Refer To:
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MAY 31 2012

Ms. Jane M. Hicks
Chief, Regulatory Division
San Francisco District
U.S. Army Corps of Engineers
1455 Market Street
San Francisco, California 94103-1398

Subject: Programmatic Biological Opinion for U.S. Army Corps of Engineers (Corps) Permitted Projects Utilizing the East Alameda County Conservation Strategy that May Affect Federally Listed Species in East Alameda County, California (Corps File Number 2011-00230S)

Dear Ms. Hicks:

This document transmits the biological opinion of the U.S. Fish and Wildlife Service (Service) on issuance of permits for projects under the Corps jurisdiction that are utilizing the East Alameda County Conservation Strategy (Conservation Strategy) under section 404 of the Federal Water Pollution Control Act, as amended (Clean Water Act), for projects that may affect one or more of the following species: the federally endangered longhorn fairy shrimp (*Branchinecta longiantenna*) and its critical habitat, the threatened vernal pool fairy shrimp (*Branchinecta lynchi*) and its critical habitat, the endangered callippe silverspot butterfly (*Speyeria callippe callippe*), the threatened California red-legged frog (*Rana draytonii*) and its critical habitat, the threatened Central California Distinct Population Segment (DPS) of the California tiger salamander (*Ambystoma californiense*) (Central California tiger salamander) and its critical habitat, the threatened Alameda whipsnake (*Masticophis lateralis euryxanthus*) and its critical habitat, the endangered San Joaquin kit fox (*Vulpes macrotis mutica*), and the endangered palmate-bracted bird's-beak (*Cordylanthus palmatus*). Your office requested consultation on October 25, 2011 and the request was received in our field office on October 28, 2011. This document is issued pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The Conservation Strategy addresses 19 focal species: nine state and/or federally listed species and ten non-listed special status species. The Conservation Strategy provides a framework for long-term conservation and management of these species and the habitats that support them. The Conservation Strategy includes measures to protect all 19 focal species as if they are currently

listed as endangered or threatened under the Act and/or the California Endangered Species Act. From a regulatory perspective, this Conservation Strategy is intended to streamline and simplify the issuance of permits for future project proponents, establish priorities for mitigation and conservation, and help maintain native biological and ecological diversity in eastern Alameda County. The Conservation Strategy aims to standardize avoidance, minimization, mitigation, and compensation requirements to comply with Federal (Act, National Environmental Policy Act), state (California Endangered Species Act, California Environmental Quality Act), and local laws and regulations relating to biological and natural resources of the study area.

The Conservation Strategy also provides a framework for future conservation efforts unrelated to mitigation/compensation from project impacts/effects. The Conservation Strategy establishes a baseline condition for acres of protected land in the study area and establishes which land cover types and focal species should be the focus of project planning and conservation efforts. The Conservation Strategy will be used to guide conservation projects, assist in obtaining grants for conservation efforts, contribute to the implementation of the San Francisco Bay Area Upland Goals projects, and promote the protection of wildlife corridors. It is intended to be utilized by various entities including but not limited to landowners, land trusts, non-profit organizations, and municipalities developing their regional planning documents.

Consultation History/Background

In late 2006 and early 2007 Zone 7 Water Agency (Zone 7) and the City of Livermore held discussions with the Service and the California Department of Fish and Game to determine the best approach to streamline consultations and provide meaningful conservation. It was determined at the time that development would not be sufficient to fund a regional habitat conservation plan and a conservation strategy similar to the Santa Rosa Plain Conservation Strategy would be more appropriate. Additional State, Federal, and local entities joined the discussion to form the Steering Committee: Alameda County, Alameda County Congestion Management Agency, Alameda County Resource Conservation District, Alameda County Waste Management Authority, California Department of Fish and Game (CDFG), City of Dublin, City of Livermore, City of Pleasanton, East Bay Regional Park District, Natural Resources Conservation Service, San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), the Service, and Zone 7 Water Agency. The Steering Committee met monthly from early 2007 to late 2010 with additional meetings as needed. In order to have public and stakeholder participation, the User Advisory Group was formed and met bimonthly or as needed. The User Advisory Group was comprised of individual rural landowners, home builders, conservation bankers, various local, state, and federal entities, and non-profit environmental groups. Working drafts of chapters were provided to the User Advisory Group for review throughout the process. Several public meetings and smaller outreach meetings were held during the development of the Conservation Strategy. A website (http://eastalco-conservation.org/index.html) was created to allow for further outreach and review. The administrative draft was released to the public in late summer 2010 for review and solicitation of comments. A public meeting followed the release of the administrative draft. The Conservation Strategy was finalized in October 2010 after an extended comment period. The Conservation Strategy is intended to be a "living document" and will be adapted, as needed, during implementation. Please refer to the website for updates. The

Corps requested section 7 consultation for projects that implement the Conservation Strategy with the Service on October 25, 2011.

The Steering Committee intended this Conservation Strategy to be used during the entire project-level analysis, starting at project inception and ending at regulatory permits. Project applicants and resource agencies reviewing project effects/impacts and making decisions about compensation/mitigation should apply the mitigation standards of the Conservation Strategy and determine if the mitigation supports its conservation goals and objectives. Further, it should be determined whether the mitigation contributes to closing one or more conservation gaps for the focal species or natural communities in question within a given Conservation Zone, and ultimately within the Conservation Strategy Study Area. Additionally, the mitigation standards and analysis should not apply to projects that do not incorporate the conservation goals, objectives, and priorities of the strategy. Those projects will require additional analysis and most likely increased mitigation.

The Conservation Strategy is designed to serve as a coordinated approach to conservation in the eastern portion of Alameda County. The Conservation Strategy not only addresses project-level mitigation for potential impacts to species and habitats throughout the eastern part of the county, but also provides a broader, coordinated approach for local conservation efforts beyond those required by regulatory requirements. The conservation goals, objectives, and conservation actions provide a long-term vision of how conservation of resources should be implemented within the Conservation Strategy Study Area (Figure 1).

Conservation Strategy Summary

The Conservation Strategy Study Area encompasses 271,485 acres in eastern Alameda County, California. The western boundary runs along the Alameda Creek watershed boundary which encompasses small portions of the cities of Fremont, Union City, and Hayward, though those jurisdictions were not formally part of the planning process. The northern, southern, and eastern boundaries follow the Alameda County line with Contra Costa County, Santa Clara County, and San Joaquin County, respectively. The Conservation Strategy generalized land cover types to seven natural communities (grassland, chaparral and coastal scrub, oak woodland, conifer woodland, riparian forest and scrub, wetlands, and open water) and two non-natural land cover types (cultivated agriculture and developed). Focal species include the federally listed longhorn fairy shrimp, vernal pool fairy shrimp, callippe silverspot butterfly, California red-legged frog, Central California tiger salamander, Alameda whipsnake, San Joaquin kit fox, and palmate-bracted bird's-beak. Non-federally listed focal species include foothill yellow-legged frog, golden eagle, tricolored blackbird, western burrowing owl, American badger, Central California coast steelhead, San Joaquin spearscale, big tarplant, congdon's tarplant, Livermore Valley tarplant and recurved larkspur.

The Conservation Strategy was designed using a multi-scale approach in accordance with principles of conservation biology. At the largest scale, conservation goals and objectives were developed to encompass ecological processes, environmental gradients, biological diversity, and regional wildlife linkages. Conservation actions were developed to implement these goals and

objectives. These conservation actions occur at the landscape scale or landscape level—generally at the scale of miles or tens of miles. At the middle scale, conservation actions were developed to address natural communities primarily through the enhancement, restoration, and management of vegetation types (i.e., land cover types). This medium scale is called the natural community level. The final scale addresses the specific needs of focal species for protection and enhancement of individuals, populations, and groups of populations. Species-level conservation actions were developed to supplement and focus actions developed at the broader scales and to ensure that all the needs of particular species are addressed.

A conservation gap analysis was conducted to determine the levels of existing protection of species and natural communities in the Conservation Strategy Study Area. The conservation gap analysis provided information on where natural communities occur in the study area, how many acres are currently protected, and how many should be protected for the natural community to persist. This was modeled using similar methods from the San Francisco Bay Area Upland Goals Project. The analysis then focused on finer scale resources such as species occurrences, species habitat, or unique physical features to conserve biological diversity not protected by the broader scale approaches. That additional focus is incorporated through species-level conservation goals and objectives.

The Conservation Strategy Study Area was subdivided into 18 Conservation Zones (Figure 2) based on California Department of Water Resources sub-watersheds to identify locations for conservation actions in areas with the same relative ecological function as those areas where impacts occur. The primary purpose of these Conservation Zones was to describe the specific areas in which conservation actions such as land acquisition will occur, without identifying individual parcels. This focuses the conservation actions in a spatially explicit manner while maintaining the flexibility to conduct these actions on different parcels and using different mechanisms (e.g., acquisition vs. incentives) to meet the conservation objectives. Chapter 4 of the Conservation Strategy discusses the conservation value and conservation acreage goals and recommendations for each Conservation Zone. Recommendations by Conservation Zones were calculated by applying the percentage of a land cover type that needs to be protected throughout the Conservation Strategy Study Area to the fraction of each land cover type in each zone. This approach allows for a more relevant assessment of the importance of resources in each zone during project review and determine where the conservation focus should be for each part of the study area.

Conservation Priorities

Conservation priorities were assessed for focal species on the basis of suitable habitat and designated critical habitat (where applicable) to focus where mitigation/conservation should occur. The conservation priorities in each Conservation Zone were determined by: (1) the rarity of the resource in the zone and in the study area; (2) the current and future threats on the persistence of the resource in the zone and in the study area; and (3) the acreage of the land cover type under protection in each zone relative to its distribution in the study area. These conservation priorities for federally listed species and their habitats in each conservation zone are described in Chapter 4 of the Conservation Strategy and are incorporated by reference.

Goals and Objectives

The conservation goals and objectives provide a long-term vision of how conservation of resources should be implemented in the study area. They were designed to maintain current populations of focal and other native species in the Conservation Strategy Study Area. In some cases, populations of focal species are expected to increase as a result of land preservation, management, habitat enhancement, habitat restoration, and habitat creation. Each conservation goal is supported by several conservation objectives. Conservation goals and objectives will be achieved through the implementation of conservation actions at the project level. These goals and objectives are described in Chapter 3 of the Conservation Strategy and are incorporated by reference.

Standardized Mitigation Ratios for Species

The core of the Conservation Strategy for the focal species is the application of standardized mitigation ratios for each species (Tables 3-4 through 3-12 of the Conservation Strategy; Appendix C of Programmatic BO). Appendices A and B are Tables 3-2 and 3-3 (minimization measures) of the Conservation Strategy. These ratios would be utilized by local jurisdictions and the Service to determine the level of mitigation necessary to offset project impacts. The ratios were developed in collaboration with the Service and based on consideration of sites with habitat quality and species occurrence typical of the study area. Figures 3-6 through 3-16 of the Conservation Strategy show spatially explicit information about how the ratios are applied. When determining the mitigation ratio for a focal species both the species' standardized mitigation ratio table and figure need to be consulted. The intent of the standardized ratios and figures is to keep the mitigation location as close to the impact area with habitat similar or better to where the impacts occur and to keep mitigation within the Conservation Strategy Study Area.

Mitigation ratios are applied to the project site based on actual site conditions and habitat quality. If the project area is more sensitive or if proposed mitigation sites have a higher habitat value, then ratios should be adjusted accordingly. Project applicants evaluate habitat quality based on a scoring system that qualitatively assigns habitat units for each focal species that occurs or may occur on the project site. A scoring system was created for all focal species except steelhead based on each species' life history (see Appendix D in this Programmatic BO and Appendix E in the Conservation Strategy for the scoresheets). Each applicable scoresheet will be completed to reflect project site conditions that are directly related to the habitat quality for each focal species. As discussed above, the assessment of habitat potential on a site will disregard the current land use and management activities that might be compromising the maximum potential habitat quality of the site. Sites with higher quality habitat will score higher for that particular focal species.

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

value. If such a determination is made, the enhancements or restoration actions will be completed prior to initiation of project impacts to ensure that the mitigation adequately offsets the impacts.

Calculating Mitigation Ratios

The mitigation needed for each species is determined by multiplying the total acres of focal species habitat that are affected by the mitigation ratios, according to the location of the mitigation site and the mix of mitigation provided. Mitigation ratios are determined by using the mitigation reference map (Figures 3-6 through 3-16 in Chapter 3 of the Conservation Strategy and Appendix C in this Programmatic BO) for the appropriate species and applying the mitigation ratio from the mitigation ratio table (Tables 3-4 through 3-12 in Chapter 3 of the Conservation Strategy and Appendix C in this Programmatic BO) depending on the location of project impact and the location of proposed mitigation.

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

For some projects, habitat restoration may be used in lieu of some habitat preservation. If habitat restoration can be provided, less habitat preservation may be required. In all cases, more species habitat will be preserved than affected.

For example, a project is proposed that will affect the Alameda whipsnake in Conservation Zone 13 and is located within a draft recovery unit but outside a critical habitat unit and the compensation site is located within the same draft recovery unit and inside a critical habitat unit. The standard mitigation ratio is 2.5:1 for Alameda whipsnake. Using the scoring sheets based on locations and habitat quality for both the impact site and compensation site, the project impact site score is 18 and the proposed compensation site score is 25. Therefore, the impact site score is divided by the compensation site score and then multiplied by the standard mitigation ratio to determine the adjusted ratio [(18 ÷ 25) x 2.5 = 1.8].

Another example, a project is proposed within grassland habitat within Conservation Zone 7. Using the scoring sheets, the proposed project will affect San Joaquin kit fox habitat (score is 25) and uplands for the Central California tiger salamander (score is 21) and California red-legged frog (score is 34). The project proponent proposes to compensate at a conservation bank near the impact site. The scores for the bank using the score sheets are: 29 for San Joaquin kit fox; 36 for Central California tiger salamander; and 50 for the California red-legged frog. The standard mitigation ratio for the species based on the locations of the impact site and the mitigation bank are: 3:1 for the San Joaquin kit fox; 3:1 for the Central California tiger salamander; and 3:1 for the California red-legged frog. The impact site scores are divided by the compensation site scores and multiplied by the standard mitigation ratios to determine the corrected ratios. The adjusted ratios are: (25 ÷ 29) x 3:1= 2.5:1 for the San Joaquin kit fox; (21 ÷ 36) x 3:1= 1.75:1 for the Central California tiger salamander; and (34 ÷ 50) x 3:1= 2:1 for the California red-legged frog.

As a third example, a project is proposed in Conservation Zone 3 that will affect Central California tiger salamanders, California red-legged frogs and critical habitat, and San Joaquin kit foxes. The habitat scores for the impact site per species are: 40 for the Central California tiger salamander, 45 for the California red-legged frog, and 18 for the San Joaquin kit fox. The project proponent proposes to mitigate in Conservation Zone 10. Using the standard mitigation ratio reference map and tables the standard ratios without the correction factor are: 4:1 for the Central California tiger salamander and 3:1 for the San Joaquin kit fox. The California red-legged frog ratio will be determined by the agencies per the standard mitigation ratio reference map and tables in Chapter 3 of the Conservation Strategy. The habitat scores for the mitigation site using the score sheets are: 21 for the Central California tiger salamander, 33 for the California red-legged frog, and 15 for the San Joaquin kit fox. After reviewing the project effects and compensation, the agencies approve a standard mitigation ratio of 4:1 for the California red-legged frog. The impact site scores are divided by the compensation site scores and multiplied by the standard mitigation ratios to determine the corrected ratios. Therefore, the corrected ratios are: (40 ÷ 21) x 4:1= 7.6:1 for the Central California tiger salamander; (45 ÷ 33) x 4:1= 5.45:1 for the California red-legged frog; and (18 ÷ 15) x 3:1= 3.6:1 for the San Joaquin kit fox.

Implementation and Adaptive Management

In order to track how the strategy is working and update the strategy over time, an Implementation Committee will be formed. The Implementation Committee will form a Public Advisory Committee to discuss technical issues, any lessons learned, and recommendations to the Implementation Committee. The intent is to update the Conservation Strategy in an adaptive manner based on input from all of the stakeholders and new scientific information. Similarly, this programmatic biological opinion may be revised based on changes to the Conservation Strategy. Chapter 5 of the Conservation Strategy outlines the processes for implementation of the multiple aspects of the Conservation Strategy.

Introduction to the Biological Opinion

This programmatic consultation evaluates the effects on the eight federally listed species named above from certain activities authorized by the Corps under Clean Water Act and Rivers and Harbors Act permits in the Conservation Strategy Study Area in eastern Alameda County, California. The purpose of this programmatic document is to streamline section 7 consultations on projects that implement the Conservation Strategy for those eight federally listed species. This programmatic consultation does not evaluate the effects for the non-federally listed focal species or the federally threatened Central California coastal steelhead (*Oncorhynchus mykiss*) focal species.

This programmatic biological opinion (Programmatic BO) with the Corps was developed as a tool to implement the Conservation Strategy and streamline consultations within the action area. The Conservation Strategy is the biological framework upon which this Programmatic BO is based. Since the Conservation Strategy is intended to be a living document via the adaptive management process, this Programmatic BO may be amended or a new one may be written if the Conservation Strategy is changed substantially.

This Programmatic BO is issued to the Corps for permits, enforcement actions or mitigation banks (project(s)) that are under their jurisdiction. Projects that are appended to this Programmatic BO will be provided individual incidental take authorization. Incidental take authorization is not provided in this document. This Programmatic BO will expedite the process for project approval provided all information listed in the next section is provided by the project applicants. The Conservation Strategy and this Programmatic BO provide the framework for compensation, mitigation, conservation, and appropriate minimization measures. The Service will track project effects, compensation and other pertinent information.

This Programmatic BO is based on information provided by the following information and documents: (1) the October 2010 East Alameda County Conservation Strategy Final Draft and corrections; (2) meetings and conversations with the Corps and CDFG; and (3) other information available to the Service.

Procedures for Appending Projects to the Programmatic Biological Opinion

The following information is required from the applicant and will be used by the Corps to evaluate whether a project can be appended to this Programmatic BO:

1. Corps Permit Application including Assessor's Parcel Number(s), Universal Transverse Mercator (UTM) or Latitude and Longitude coordinates, GIS shape files with metadata, and street address of the project;

2. Corps-verified jurisdictional determination;

3. Biological Assessment pursuant to 50 Code of Federal Regulations (CFR) 402.12. The Biological Assessment will include at a minimum:

a. Detailed project and compensation maps with listed species occurrences and critical habitat;
b. Baseline conditions for listed species;
c. Construction and compensation details;
d. Conservation measures; and
e. Effects of the project, conservation measures, and compensation on the listed species.

The Corps will make one of the following determinations of effect for a project by reviewing the Biological Assessment and other information provided by the applicant and will take the identified action:

- *No effect.* The proposed project will not affect listed species or critical habitat. The Corps will not consult with the Service.

- *May affect but is not likely to adversely affect listed species or critical habitat.* The proposed project effects are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and do not reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, for these effects a person would not: (1) be able to meaningful measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur. The Corps will consult with the Service for concurrence and forward all biological and other pertinent information.

- *May affect and is likely to adversely affect listed species or critical habitat.* The proposed project has any adverse effect, either as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effects are not: discountable, insignificant, or beneficial. The proposed project may be overall beneficial to listed species, but is also likely to cause some adverse effects. The proposed project anticipates incidental take. The Corps will consult with the Service, requesting that the proposed project to be appended to this Programmatic BO and forward all biological and other pertinent information.

The Service will review the proposed project to evaluate whether it is appropriate to append the project to this Programmatic BO based on the level of effects, avoidance, minimization, and compensation measures. The Service may determine some projects require separate section 7 consultation and will not be appended to this Programmatic BO. If the Service does not concur the project is appropriate to be appended to this Programmatic BO, the Service will notify the Corps in writing. Applicants who have had consultation initiated by the Corps prior to the date of this Programmatic BO may continue with that consultation or may request their project be appended to this Programmatic BO.

Suitability Criteria for Projects to be Appended to the Programmatic Biological Opinion

Actions that fall under this consultation are projects that may adversely affect the above mentioned listed species either by take of individuals, temporary disturbance or permanent loss of habitat, and/or temporary disturbance or permanent loss of critical habitat, but which nonetheless are not likely to jeopardize the continued existence of the listed species and are not likely to destroy or adversely modify critical habitat. In order for individual projects to be appended to this Programmatic BO, they must be consistent with the Conservation Strategy and have been reviewed by the Corps and Service via the procedure described above. Individual projects will be located within the Conservation Strategy Study Area and fall under the list of covered activities in this Programmatic BO. Projects that are not covered activities will not be appended to this Programmatic BO and will require individual formal consultation.

Projects will adhere to the maximum extent practicable the Project-Level Use of the Strategy and Conservation Goals and Objectives as outlined in Chapter 3 of the Conservation Strategy including the Generalized Avoidance and Minimization Measures to Reduce Effects on Focal Species, Species-Specific Avoidance and Minimization Measures, Standardized Mitigation Ratios for focal species, and Impact/Mitigation Scoring of Focal Species Habitat. Projects shall follow Conservation Priorities and Summary actions for their specific Conservation Zone as described in Chapter 4 of the Conservation Strategy. All of these sections have been summarized above.

Compensation for project effects should occur within the Conservation Strategy Study Area for the project to be appended to the Programmatic BO. Consistent with the Conservation Strategy, the Service will consider compensation outside of the Conservation Strategy Study Area on a case by case basis. Any projects wishing to use areas outside of the Conservation Strategy Study Area shall provide a biological rational for not compensating within the Conservation Strategy Study Area. The Service reserves the right to determine if the project and compensation is appropriate to append to this Programmatic BO.

BIOLOGICAL OPINION

Description of the Action

Covered Activities

Development Projects:

- Residential
- Commercial
- Industrial
- Parks
- Public Institutions
- Associated Infrastructure (roads, utilities) for new development and redevelopment
- Park Facilities: Security residences, service yards, staging areas, small interpretive

facilities, campgrounds, and picnic areas (includes utilities, fencing for facilities, water and septic, maintenance)

Infrastructure Projects:

- Power Infrastructure and maintenance (includes transmission lines): New and existing infrastructure; minor construction
- Road Construction and Maintenance: New and existing roads
- Trail Construction and Maintenance: New and existing trails
- Rail Construction and Maintenance: New and existing
- Weather Towers and Maintenance: New and existing towers
- Telecommunication Towers and Maintenance: New and existing towers
- Bridge Construction and Maintenance: New and existing bridges and ramps
- Solar Projects: Installation, operation, and maintenance
- Wind Energy Projects: Installation, operation, and maintenance. Avian and bat effects are not included in this consultation.
- Electrical Co-Generation Plants
- Flood Wall Installation
- Bank Stabilization
- Low Flow Crossings and Maintenance
- Levee Installation and Maintenance
- Sedimentation Basins Construction and Maintenance
- Water Detention Basins Construction and Maintenance
- Drainage Pump Station
- New Flood Control Channel: Excavation and construction
- Flood Control Facilities and Appurtenances
- Culvert Installation and Maintenance
- Grade Control Structures: Construction, maintenance, removal
- Water Diversion Structure Construction and Maintenance. The actual diversion of water is not included in this consultation.
- Retaining Walls
- Water Treatment Plants and Appurtenances
- Water Pipelines and Appurtenances
- Sewer/Wastewater Pipelines
- Pump Stations
- Sludge Beds
- Aqueduct and Transmission System Turnouts: Construction and maintenance.
- Wells: Production, monitoring, cathodic protection and injection.
- Water Storage Tanks: Construction and maintenance
- Water Spreading Basins: For groundwater recharge
- Stream Gage: Installation and repairs
- Recycled Water Projects: Irrigation, recharge
- Solid Waste Discharges: Soil disposal, stockpiles (uncontaminated)
- Groundwater remediation systems

Maintenance Projects:

- Sediment Removal: Flood control channel, basin, stock pond
- Debris Removal: For large trash and woody debris
- Dams and Other Water Impoundments (Existing): Maintenance. New construction or increases in capacity or size are not covered.
- Vegetation Management: Riparian, native, and control of invasive vegetation (dependent on application)

Restoration Projects:

- Pond and/or Stream Restoration/Enhancement/Construction
- Fish Barrier Removal and Modification
- Wetland Construction and Maintenance (if needed)
- Channel Reconfiguration to Increase Complexity for Floodplain Creation and Recontouring
- Species/Habitat Conservation/Restoration Projects

Enforcement Actions:

- Actions Related to Regulatory Enforcement (Act, National Environmental Policy Act California Endangered Species Act, California Environmental Quality Act, Clean Water Act, etc...)

Certain activities will be covered as part of a long term management plan for conservation areas that are managed for listed species as compensation for project effects. These activities may include but are not limited to: integrated pest management, vegetation management, grazing, species surveys, conservation area enhancement actions, fence installation and maintenance, grazing water supply infrastructure installation and maintenance, and pond maintenance.

Minimization Measures

To the maximum extent practicable, projects authorized under this Programmatic BO will be designed and implemented in such a way as to minimize adverse effects to listed species and/or their habitat. To achieve that purpose, the projects will follow the Focal Species Goals and Objectives as described in Chapter 3 of the Conservation Strategy, Generalized Avoidance and Minimization Measures to Reduce Effects on Focal Species (Appendix A of this Programmatic BO and Table 3-2 in the Conservation Strategy), Species-Specific Avoidance and Minimization Measures (Appendix B of this Programmatic BO and Table 3-3 in the Conservation Strategy), Standardized Mitigation Ratios (Appendix C of this Programmatic BO and Table 3-4 in the Conservation Strategy), and Impact/Mitigation Scoring of Focal Species Habitat (Appendix D of this Programmatic BO and Appendix E in the Conservation Strategy).

In addition to the measures in the Conservation Strategy and discussed above, the Service has added the following general and species specific minimization measures. The Service recognizes that not all projects will require all of these measures. The applicant may request modification of these measures, if applicable. However, these measures below will be implemented unless

otherwise modified or waived by the Service in writing.

General Minimization Measures

1. At least 15 days prior to any ground disturbing activities, the applicant will submit to the Service for review and approval the qualifications of the proposed biological monitor(s). A qualified biological monitor means any person who has completed at least four years of university training in wildlife biology or a related science and/or has demonstrated field experience in the identification and life history of the listed species.

2. A Service-approved biological monitor will remain on-site during all construction activities in or adjacent to habitat for listed species. The Service-approved biological monitor(s) will be given the authority to stop any work that may result in the take of listed species. If the Service-approved biological monitor(s) exercises this authority, the Service will be notified by telephone and electronic mail within one working day. The Service-approved biological monitor will be the contact for any employee or contractor who might inadvertently kill or injure a listed species or anyone who finds a dead, injured or entrapped individual. The Service-approved biological monitor will possess a working wireless/mobile phone whose number will be provided to the Service.

3. Prior to construction, a construction employee education program will be conducted in reference to potential listed species on site. At minimum, the program will consist of a brief presentation by persons knowledgeable in endangered species biology and legislative protection (Service-approved biologist) to explain concerns to contractors, their employees, and agency personnel involved in the project. The program will include: a description of the species and their habitat needs; any reports of occurrences in the project area; an explanation of the status of each listed species and their protection under the Act; and a list of measures being taken to reduce effects to the species during construction and implementation. Fact sheets conveying this information and an educational brochure containing color photographs of all listed species in the work area(s) will be prepared for distribution to the above-mentioned people and anyone else who may enter the project area. A list of employees who attend the training sessions will be maintained by the applicant to be made available for review by the Service upon request. Contractor training will be incorporated into construction contracts and will be a component of weekly project meetings.

4. Preconstruction surveys for listed species will be performed immediately prior to groundbreaking activities. Surveys will be conducted by Service-approved biologists. If at any point, construction activities cease for more than five consecutive days, additional preconstruction surveys will be conducted prior to the resumption of these actions.

5. To prevent the accidental entrapment of listed species during construction, all excavated holes or trenches deeper than 6 inches will be covered at the end of each work day with plywood or similar materials. Foundation trenches or larger excavations that cannot easily be covered will be ramped at the end of the work day to allow trapped animals an

escape method. Prior to the filling of such holes, these areas will be thoroughly inspected for listed species by Service-approved biologists. In the event of a trapped animal is observed, construction will cease until the individual has been relocated to an appropriate location.

6. Translocation will be approved on a project specific basis. The applicant will prepare a listed species translocation plan for the project to be reviewed and approved by the Service prior to project implementation. The plan will include trapping and translocation methods, translocation site, and post translocation monitoring.

7. Only Service-approved biologists will conduct surveys and move listed species.

8. All trash and debris within the work area will be placed in containers with secure lids before the end of each work day in order to reduce the likelihood of predators being attracted to the site by discarded food rappers and other rubbish that may be left on-site. Containers will be emptied as necessary to prevent trash overflow onto the site and all rubbish will be disposed of at an appropriate off-site location.

9. All vegetation which obscures the observation of wildlife movement within the affected areas containing or immediately adjacent aquatic habitats will be completely removed by hand just prior to the initiation of grading to remove cover that might be used by listed species. The Service-approved biologist will survey these areas immediately prior to vegetation removal to find, capture and relocate any observed listed species, as approved by the Service.

10. All construction activities must cease one half hour before sunset and should not begin prior to one half hour after sunrise. There will be no nighttime construction.

11. Grading and construction will be limited to the dry season, typically May-October.

12. Best Management Practices (BMPs) will be used to minimize erosion and impacts to water quality and effects to aquatic habitat. If necessary, a Storm Water Pollution Prevention Plan (SWPPP) will be prepared.

13. The applicant will ensure a readily available copy of this biological opinion is maintained by the construction foreman/manager on the project site whenever earthmoving and/or construction is taking place. The name and telephone number of the construction foreman/manager will be provided to the Service prior to groundbreaking.

14. The construction area shall be delineated with high visibility temporary fencing at least 4 feet in height, flagging, or other barrier to prevent encroachment of construction personnel and equipment outside of the construction area. Such fencing shall be inspected and maintained daily until completion of the project. The fencing will be removed only when all construction equipment is removed from the site.

15. Silt fencing or wildlife exclusion fencing will be used to prevent listed species from entering the project area. Exclusion fencing will be at least 3 feet high and the lower 6 inches of the fence will be buried in the ground to prevent animals from crawling under. The remaining 2.5 feet will be left above ground to serve as a barrier for animals moving on the ground surface. The fence will be pulled taut at each support to prevent folds or snags. Fencing shall be installed and maintained in good condition during all construction activities. Such fencing shall be inspected and maintained daily until completion of the project. The fencing will be removed only when all construction equipment is removed from the site.

16. A Service-approved biologist shall ensure that the spread or introduction of invasive exotic plant species shall be avoided to the maximum extent possible. When practicable, invasive exotic plants in the project areas shall be removed.

17. Project sites shall be revegetated with an appropriate assemblage of native riparian wetland and upland vegetation suitable for the area. A species list and restoration and monitoring plan shall be included with the project proposal for review and approval by the Service and the Corps. Such a plan must include, but not be limited to, location of the restoration, species to be used, restoration techniques, time of year the work will be done, identifiable success criteria for completion, and remedial actions if the success criteria are not achieved.

18. If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow shall be removed in a manner that would allow flow to resume with the least disturbance to the substrate.

19. A Service-approved biologist shall permanently remove, from within the project area, any individuals of exotic species, such as bullfrogs, crayfish, and centrarchid fishes, to the maximum extent possible. The applicant shall have the responsibility to ensure that their activities are in compliance with the California Fish and Game Code.

Callippe Silverspot Butterfly

1. Preconstruction surveys for the larval food plants of callippe silverspot butterfly will be conducted during typical bloom season during a period from January through April. Any larval food plants found within 300 feet of the project footprint will be clearly marked with pin flagging. Flagged areas will be avoided to the maximum extent practicable and if possible, fenced for avoidance. In addition, orange fencing will be placed along the edge of the work area near any larval food plants to prevent workers and vehicles from entering this area.

2. The applicant and contractors will minimize generation and movement of construction-

related dust through BMPs and SWPPP provisions, such as those that would be conditioned by the SFBRWQCB and Bay Area Air Quality Management District. Specifically, contracts would enforce prudent site watering and application of nontoxic soil stabilizers. The amount of watering will be monitored to ensure polluted runoff from roads does not occur (roads will not be over-watered).

California Red-Legged Frog

1. A Service-approved biologist shall survey the work site immediately prior to construction activities. If California red-legged frogs, tadpoles, or eggs are found, the approved biologist shall contact the Service to determine if moving any of these life-stages is appropriate. In making this determination the Service shall consider if an appropriate relocation site exists as provided in the relocation plan. If the Service approves moving animals, the approved biologist shall be allowed sufficient time to move California red-legged frogs from the work site before work activities begin. Only Service-approved biologists shall participate in activities associated with the capture, handling, and monitoring of California red-legged frogs.

2. Bare hands shall be used to capture California red-legged frogs. Service-approved biologists will not use soaps, oils, creams, lotions, repellents, or solvents of any sort on their hands within two hours before and during periods when they are capturing and relocating individuals. To avoid transferring disease or pathogens of handling of the amphibians, Service-approved biologists will follow the Declining Amphibian Populations Task Force's "Code of Practice."

Central California Tiger Salamander

1. A Service-approved biologist shall survey the work site immediately prior to construction activities. If Central California tiger salamanders, larvae, or eggs are found, the approved biologist shall contact the Service to determine if moving any of these life-stages is appropriate. In making this determination the Service shall consider if an appropriate relocation site exists as provided in the relocation plan. If the Service approves moving animals, the approved biologist shall be allowed sufficient time to move Central California tiger salamanders from the work site before work activities begin. Only Service-approved biologists shall participate in activities associated with the capture, handling, and monitoring of Central California tiger salamanders.

2. Bare hands shall be used to capture Central California tiger salamanders. Service-approved biologists will not use soaps, oils, creams, lotions, repellents, or solvents of any sort on their hands within two hours before and during periods when they are capturing and relocating individuals. To avoid transferring disease or pathogens of handling of the amphibians, Service-approved biologists will follow the Declining Amphibian Populations Task Force's "Code of Practice."

San Joaquin Kit Fox

1. A qualified Service-approved biologist will conduct a preconstruction survey no more than 30 days before the beginning of ground disturbance or any activity likely to affect San Joaquin kit fox. This measure will be implemented in all off-road construction areas. The biologist will survey the proposed construction area and a 200-foot buffer area around the construction area to identify suitable dens. The biologist will conduct den searches by systematically walking transects spaced 30-100 feet apart through the survey area. Transect distance should be determined on the basis of the height of vegetation such that 100 percent visual coverage of the project area is achieved. If dens are found during the survey, the biologist will map the location of each den as well as record the size and shape of the den entrance; the presence of tracks, scat, and prey remains; and if the den was recently excavated. The biologist will also record information on prey availability (e.g., ground squirrel colonies). The status of the den as defined by the Service should also be determined and recorded. Dens will be classified in one of the following four den status categories:

    a. Potential den: Any subterranean hole within the species' range that has entrances of appropriate dimensions for which available evidence is sufficient to conclude that it is being used or has been used by a San Joaquin kit fox. Potential dens comprise: (1) any suitable subterranean hole; or (2) any den or burrow of another species (e.g., coyote, badger, red fox, or ground squirrel) that otherwise has appropriate characteristics for San Joaquin kit fox use.

    b. Known den: Any existing natural den or artificial structure that is used or has been used at any time in the past by a San Joaquin kit fox. Evidence of use may include historical records; past or current radio telemetry or spotlighting data; San Joaquin kit fox signs such as tracks, scat, and/or prey remains; or other reasonable proof that a given den is being or has been used by a San Joaquin kit fox.

    c. Natal or pupping den: Any den used by San Joaquin kit fox to whelp and/or rear their pups. Natal/pupping dens may be larger with more numerous entrances than dens occupied exclusively by adults. These dens typically have more San Joaquin kit fox tracks, scat, and prey remains in the vicinity of the den, and may have a broader apron of matted dirt and/or vegetation at one or more entrances. A natal den, defined as a den in which San Joaquin kit fox pups are actually whelped but not necessarily reared, is a more restrictive version of the pupping den. In practice, however, it is difficult to distinguish between the two; therefore, for purposes of this definition either term applies.

    d. Atypical den: Any artificial structure that has been or is being occupied by a San Joaquin kit fox. Atypical dens may include pipes, culverts, and diggings beneath concrete slabs and buildings.

Written results of the surveys will be submitted to the Service within one week of the completion of surveys and prior to the beginning of ground disturbance and/or construction activities likely to affect San Joaquin kit fox.

2. After preconstruction den searches and before the commencement of construction activities, a qualified Service-approved biologist will establish and maintain the following exclusion zones measured in a radius outward from the entrance or cluster of entrances of each den.

    a. Potential and atypical dens: A total of 4-5 flagged stakes will be placed 50 feet from the den entrance to identify the den location.

    b. Known den: Orange construction barrier fencing will be installed between the construction work area and the known den site at a minimum distance of 100 feet from the den. The fencing will be maintained until all construction-related disturbances have been terminated. At that time, all fencing will be removed to avoid attracting subsequent attention to the den.

    c. Natal/pupping den: The Service will be contacted immediately if a natal or pupping den is discovered at or within 200 feet from the boundary of the construction area.

    d. Construction and other project activities will be prohibited or greatly restricted within these exclusion zones. Only essential vehicular operation on existing roads and foot traffic should be permitted and articulated to the Service. All other construction activities, vehicle operation, material and equipment storage, and other surface-disturbing activities will be prohibited in the exclusion zones.

    e. In cases where avoidance is not a reasonable alternative, limited destruction of potential San Joaquin kit fox dens will be allowed. Potential dens can be removed by careful hand excavation by a Service-approved biologist or under the supervision of a Service-approved biologist, after the dens have been monitored for three days with tracking medium or a remote sensor camera and determined to be vacant of San Joaquin kit foxes. If, during excavation or monitoring, a potential den is determined to be currently or previously used (e.g., San Joaquin kit fox sign found inside) by San Joaquin kit fox, then destruction of the den or construction in that area will cease and the Service will be notified immediately.

3. Vehicle traffic will be restricted to established roads, construction areas, and other designated areas.

4. Grading activities shall be designed to minimize or eliminate effects to rodent burrows. Areas with high concentrations of burrows and large burrows suitable for San Joaquin kit fox dens shall be avoided by grading activities to the maximum extent possible. In

addition, when concentrations of burrows or large burrows are observed within the site these areas shall be staked and flagged to ensure construction personnel are aware of their location and to facilitate avoidance of these areas.

5. Compensate for the loss of San Joaquin kit foxes and suitable habitat by protecting occupied habitat and/or restoring suitable habitat to establish and maintain San Joaquin kit fox presence.

Palmate-Bracted Bird's-Beak

1. Prior to any ground disturbance in the project area, if feasible, all seasonal wetlands and areas containing palmate-bracted bird's-beak, and any suitable habitat will be staked or flagged and a temporary barrier (silt fencing, etc.) will be constructed.

Compensation/Mitigation

Compensation/mitigation in this Programmatic BO is only to minimize adverse effects to the above named federally listed species. This section does not cover mitigation for effects/impacts to state listed species or waters regulated by the Corps or SFBRWQCB.

As stated in the Suitability Criteria, compensation should occur within the Conservation Strategy Study Area. Compensation shall be identified and approved prior to project commencement. Ideally, compensation should be implemented prior to project commencement. If the land acquisition is not acquired and protected prior to project effects, financial assurances will be provided to the Service and a strict timeline for conservation easement recordation and management will be implemented.

Compensation for permanent effects to listed species and habitat can occur through buying credits at a Service-approved conservation/mitigation bank or land acquisition, management, and protection. Species presence must be established and documented on the compensation site. The conservation property will be free of all liens and incompatible leases and easements or they will be terminated or subordinated to the conservation easement. Geological Hazard Abatement Districts will not be allowed to be established on compensation areas, manage compensation sites, or fund endowments for the management of listed species habitat. Compensation sites will follow the Conservation Priorities and mitigation ratios in the Conservation Strategy for the listed species affected by the project and will be subject to success requirements.

Compensation for temporary effects is similar to compensation for permanent effects discussed above with the exception that the affected areas need to be restored to pre-project conditions within 12 months from the commencement of the activity. In addition to restoration, compensation will occur at a 1:1 ratio at a Service-approved conservation/mitigation bank or through land acquisition, management, and protection. Projects that require longer than 12 months from the commencement of the activity to restore their effects will be considered to have permanent effects and will be required to use the standardized mitigation ratios.

Land acquisition can either be in fee title with a permanent conservation easement placed on the property or through a permanent conservation easement without holding fee title. A Service-approved recorded conservation easement is required and a copy will be provided to the Service prior to project implementation or within the specific approved timeframe. A Service-approved resource management plan and long-term maintenance and monitoring endowment must be established. The applicant is required to obtain the approval of the conservation easement holder, land manager, and endowment holder of the compensation area.

Appendix F of the Conservation Strategy provides examples of what the Service requires for compensation (conservation easement template, management plan template, requirements for off-site compensation, performance securities). The Service periodically revises these documents. Contact the Sacramento Fish and Wildlife Office for the most recent templates and guidance (916-414-6600; http://www.fws.gov/sacramento/).

Reporting and Notification

In order to verify compliance with the Programmatic BO, the project applicant will be required to submit reports during various stages of project implementation. Applicants with projects that have relatively small effects or are limited in scope and duration can request the Service waive this requirement. The Service will be notified immediately in writing if the project is not in compliance with the Programmatic BO and/or the accompanying letter appending the project to the Programmatic BO. Documentation will be provided to the Service verifying compliance with pre-project minimization measures no later than 14 calendar days before project implementation.

The applicant will provide monthly compliance and status reports to the Service during construction documenting: (1) dates that construction occurred; (2) photo documentation of construction and applicable minimization measures; (3) pertinent information concerning the success of the project in meeting minimization measures including status of the compensation; (4) an explanation of failure to meet such measures, if any; (5) known project effects on listed species, if any; (6)occurrences of incidental take of listed species, if any; (7) documentation of employee environmental education; and (8) other pertinent information. Applicants with projects that have relatively small effects or are limited in scope and duration can request the Service waive this requirement.

The applicant will submit a post-construction compliance report prepared by the Service-approved biologist to the Sacramento Fish and Wildlife Office within 30 calendar days of the date of the completion of construction activity. This report will compile the monthly reports and detail: (1) dates that construction occurred; (2) photo documentation of construction and applicable minimization measures; (3) pertinent information concerning the success of the project in meeting minimization measures including status of the compensation; (4) an explanation of failure to meet such measures, if any; (5) known project effects on listed species, if any; (5) occurrences of incidental take of listed species, if any; (7) documentation of employee environmental education; (8) as built drawings for the project and any compensation/mitigation features; and (9) other pertinent information.

The Service must be notified within one (1) working day of the finding of any injured listed species or any unanticipated damage to its habitat associated with the proposed project. Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Notification must include the date, time, and precise location of the individual/incident clearly indicated on a United States Geological Survey 7.5 minute quadrangle and other maps at a finer scale, as requested by the Service, and any other pertinent information. Dead individuals must be sealed in a sealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site. The Service contact persons are the Coast Bay/Forest Foothills Division Chief of the Endangered Species Program at the Sacramento Fish and Wildlife Office at (916) 414-6600; and the Resident Agent-in-Charge of the Service's Division of Law Enforcement, 2800 Cottage Way, Room W-2928, Sacramento, California 95825, at (916) 414-6660.

Non-Compliance and Remedial Actions

Projects that are not in compliance with the Programmatic BO and the accompanying letter appending the project to the Programmatic BO will be required to correct the matter(s) immediately and provide additional compensation. The amount of additional compensation will be determined on case-by-case basis but will be subject to the same requirements as the original compensation. The amount of remedial compensation will increase commensurate with the degree of the violation and the amount of time the project is out of compliance.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the purposes of the effects assessment, the action area is the Conservation Strategy Study Area encompassing 271,485 acres in eastern Alameda County, California. The western boundary runs along the Alameda Creek watershed boundary which encompasses small portions of the cities of Fremont, Union City, and Hayward, though those jurisdictions were not formally part of the planning process. The northern, southern, and eastern boundaries follow the Alameda County line with Contra Costa County, Santa Clara County, and San Joaquin County, respectively (Figure 1-1).

Analytical Framework for the Jeopardy and Adverse Modification Analyses

Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis in this Programmatic BO relies on four components: (1) the Status of the Species, which evaluates the longhorn fairy shrimp, vernal pool fairy shrimp, callippe silverspot butterfly, California red-legged frog, Central California tiger salamander, Alameda whipsnake, San Joaquin kit fox, and palmate-bracted bird's-beak's range-wide condition, the factors responsible for that condition, and their survival and recovery needs; (2) the Environmental Baseline, which evaluates the condition of the eight

species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the these listed animals; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed federal action and the effects of any interrelated or interdependent activities on the longhorn fairy shrimp, vernal pool fairy shrimp, callippee silverspot butterfly, California red-legged frog, Central California tiger salamander, Alameda whipsnake, San Joaquin kit fox and palmate-bracted bird's-beak; (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area on them.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the longhorn fairy shrimp, vernal pool fairy shrimp, callippe silverspot butterfly, California red-legged frog, Central California tiger salamander, Alameda whipsnake, San Joaquin kit fox, and palmate-bracted bird's-beak's current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of these eight species in the wild.

The jeopardy analysis in this Programmatic BO places an emphasis on consideration of the range-wide survival and recovery needs of the longhorn fairy shrimp, vernal pool fairy shrimp, callippe silverspot butterfly, California red-legged frog, Central California tiger salamander, Alameda whipsnake, San Joaquin kit fox, and palmate-bracted bird's-beak and the role of the action area in their survival and recovery as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Adverse Modification Determination

This Programmatic BO does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

In accordance with policy and regulation, the adverse modification analysis in this Programmatic BO relies on four components: (1) the Status of Critical Habitat, which evaluates the rangewide condition of proposed critical habitat for the longhorn fairy shrimp, vernal pool fairy shrimp, California red-legged frog, Central California tiger salamander, and Alameda whipsnake in terms of primary constituent elements (PCE)s, the factors responsible for that condition, and the intended recovery function of the critical habitat at the provincial and range-wide scale; (2) the Environmental Baseline, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the PCEs and how that will influence the recovery role of affected critical habitat units and; (4) Cumulative Effects which evaluates the effects of future, non-Federal activities in the action area on the PCEs and how that will influence the recovery role of affected critical habitat units.

For purposes of the adverse modification determination, the effects of the proposed Federal action on the longhorn fairy shrimp, vernal pool fairy shrimp, California red-legged frog, Central California tiger salamander, and Alameda whipsnake critical habitat are evaluated in the context of the range-wide condition of the critical habitat at the provincial and range-wide scales, taking into account any cumulative effects, to determine if the critical habitat range-wide would remain functional(or would retain the current ability for the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for the longhorn fairy shrimp, vernal pool fairy shrimp, California red-legged frog, Central California tiger salamander, and Alameda whipsnake.

The analysis in this Programmatic BO places an emphasis on using the intended range-wide recovery function of longhorn fairy shrimp, vernal pool fairy shrimp, California red-legged frog, Central California tiger salamander, and Alameda whipsnake critical habitat and the role of the action area relative to that intended function as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the adverse modification determination.

Status of the Species

Longhorn Fairy Shrimp

Refer to the *Longhorn Fairy Shrimp (Branchinecta longiantenna) 5-Year Review: Summary and Evaluation* (Service 2007a) for the current Status of the Species.

Longhorn Fairy Shrimp Critical Habitat

A final rule designated approximately 858,846 acres of critical habitat collectively for 4 vernal pool crustaceans and 11 vernal pool plants in 34 counties in California and 1 county in southern Oregon on August 11, 2005 (Service 2005a). On February 10, 2006, a final rule describing species-specific unit descriptions and maps identifying the critical habitat for each individual species was published (Service 2006a). The rule identifies approximately 13,557 acres within 3 critical habitat units in Alameda, Contra Costa, Merced, and San Luis Obispo counties, California.

The PCEs of critical habitat for longhorn fairy shrimp are the habitat components that provide: (1) topographic features characterized by mounds and swales and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools and providing for dispersal and promoting hydroperiods of adequate length in the pools; (2) depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 23 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands; (3) sources of food, expected to be detritus occurring in the pools, contributed by overland flow from the pools' watershed, or the results of biological

processes within the pools themselves, such as single-celled bacteria, algae, and dead organic matter, to provide for feeding; and (4) structure within the pools consisting of organic and inorganic materials, such as living and dead plants from plant species adapted to seasonally inundated environments, rocks, and other inorganic debris that may be washed, blown, or otherwise transported into the pools, that provide shelter. Refer to the final designation of critical habitat for additional information.

Vernal Pool Fairy Shrimp

Refer to the *Vernal Pool Fairy Shrimp (Branchinecta lynchi) 5-Year Review: Summary and Evaluation* (Service 2007b) for the current Status of the Species.

Vernal Pool Fairy Shrimp Critical Habitat

A final rule designated approximately 858,846 acres of critical habitat collectively for 4 vernal pool crustaceans and 11 vernal pool plants in 34 counties in California and 1 county in southern Oregon on August 11, 2005 (Service 2005a). On February 10, 2006, a final rule describing species-specific unit descriptions and maps identifying the critical habitat for each individual species was published (Service 2006a). The rule identifies approximately 597,821 acres within 32 critical habitat units in Jackson County, Oregon, and Alameda, Amador, Butte, Contra Costa, Fresno, Kings, Madera, Mariposa, Merced, Monterey, Napa, Placer, Sacramento, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Shasta, Solano, Stanislaus, Tehama, Tulare, Ventura, and Yuba counties, California.

The PCEs of critical habitat for vernal pool fairy shrimp are the habitat components that provide: (1) topographic features characterized by mounds and swales and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools and providing for dispersal and promoting hydroperiods of adequate length in the pools; (2) depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands; (3) sources of food, expected to be detritus occurring in the pools, contributed by overland flow from the pools' watershed, or the results of biological processes within the pools themselves, such as single-celled bacteria, algae, and dead organic matter, to provide for feeding; and (4) structure within the pools consisting of organic and inorganic materials, such as living and dead plants from plant species adapted to seasonally inundated environments, rocks, and other inorganic debris that may be washed, blown, or otherwise transported into the pools, that provide shelter. Refer to the final designation of critical habitat for additional information.

Callippe Silverspot Butterfly

Refer to the *Callippe Silverspot Butterfly (Speyeria callippe callippe) 5-Year Review: Summary and Evaluation* (Service 2009a) for the current Status of the Species.

California Red-Legged Frog

Listing Status: The California red-legged frog was listed as a threatened species on May 23, 1996 (61 FR 25813) (Service 1996). Critical habitat was designated for this species on April 13, 2006 (71 FR 19244) (Service 2006b) and revisions to the critical habitat designation were published on March 17, 2010 (75 FR 12816) (Service 2010). At this time, the Service recognized the taxonomic change from *Rana aurora draytonii* to *Rana draytonii* (Shaffer *et al.* 2010). A recovery plan was published for the California red-legged frog on September 12, 2002 (Service 2002).

Description: The California red-legged frog is the largest native frog in the western United States (Wright and Wright 1949), ranging from 1.5 to 5.1 inches in length (Stebbins 2003). The abdomen and hind legs of adults are largely red, while the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have light centers (Stebbins 2003), and dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 0.6 to 3.1 inches in length, and the background color of the body is dark brown and yellow with darker spots (Storer 1925).

Distribution: The historic range of the California red-legged frog extended from the vicinity of Elk Creek in Mendocino County, California, along the coast inland to the vicinity of Redding in Shasta County, California, and southward to northwestern Baja California, Mexico (Fellers 2005; Jennings and Hayes 1985; Hayes and Krempels 1986). The species was historically documented in 46 counties but the taxa now remains in 238 streams or drainages within 23 counties, representing a loss of 70 percent of its former range (Service 2002). California red-legged frogs are still locally abundant within portions of the San Francisco Bay area and the Central California Coast. Isolated populations have been documented in the Sierra Nevada, northern Coast, and northern Transverse Ranges. The species is believed to be extirpated from the southern Transverse and Peninsular ranges, but is still present in Baja California, Mexico (CDFG 2011).

Status and Natural History: California red-legged frogs predominately inhabit permanent water sources such as streams, lakes, marshes, natural and manmade ponds, and ephemeral drainages in valley bottoms and foothills up to 4,921 feet in elevation (Jennings and Hayes 1994, Bulger *et al.* 2003, Stebbins 2003). However, they also inhabit ephemeral creeks, drainages and ponds with minimal riparian and emergent vegetation. California red-legged frogs breed from November to April, although earlier breeding records have been reported in southern localities. Breeding generally occurs in still or slow-moving water often associated with emergent vegetation, such as cattails, tules or overhanging willows (Storer 1925, Hayes and Jennings 1988). Female frogs deposit egg masses on emergent vegetation so that the egg mass floats on or

near the surface of the water (Hayes and Miyamoto 1984).

Habitat includes nearly any area within 1-2 miles of a breeding site that stays moist and cool through the summer, including vegetated areas with coyote brush, California blackberry thickets, and root masses associated with willow and California bay trees (Fellers 2005). Sheltering habitat for California red-legged frogs potentially includes all aquatic, riparian, and upland areas within the range of the species and includes any landscape feature that provides cover, such as animal burrows, boulders or rocks, organic debris such as downed trees or logs, and industrial debris. Agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay stacks may also be used. Incised stream channels with portions narrower and depths greater than 18 inches also may provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival.

California red-legged frogs do not have a distinct breeding migration (Fellers 2005). Adults are often associated with permanent bodies of water. Some individuals remain at breeding sites year-round, while others disperse to neighboring water features. Dispersal distances are typically less than 0.5-mile, with a few individuals moving up to 1-2 miles (Fellers 2005). Movements are typically along riparian corridors, but some individuals, especially on rainy nights, move directly from one site to another through normally inhospitable habitats, such as heavily grazed pastures or oak-grassland savannas (Fellers 2005).

In a study of California red-legged frog terrestrial activity in a mesic area of the Santa Cruz Mountains, Bulger *et al.* (2003) categorized terrestrial use as migratory and non-migratory. The latter occurred from one to several days and was associated with precipitation events. Migratory movements were characterized as the movement between aquatic sites and were most often associated with breeding activities. Bulger *et al.* (2003) reported that non-migrating frogs typically stayed within 200 feet of aquatic habitat 90 percent of the time and were most often associated with dense vegetative cover, i.e., California blackberry, poison oak and coyote brush. Dispersing frogs in northern Santa Cruz County traveled distances from 0.25-mile to more than 2 miles without apparent regard to topography, vegetation type, or riparian corridors (Bulger *et al.* 2003).

In a study of California red-legged frog terrestrial activity in a xeric environment in eastern Contra Costa County, Tatarian (2008) noted that a 57 percent majority of frogs fitted with radio transmitters in the Round Valley study area stayed at their breeding pools, whereas 43 percent moved into adjacent upland habitat or to other aquatic sites. Her study reported a peak seasonal terrestrial movement occurring in the fall months associated with the first 0.2-inch of precipitation and tapering off into spring. Upland movement activities ranged from 3 to 233 feet, averaging 80 feet, and were associated with a variety of refugia including grass thatch, crevices, cow hoof prints, ground squirrel burrows at the base of trees or rocks, logs, and under man-made structures; others were associated with upland sites lacking refugia (Tatarian 2008). The majority of terrestrial movements lasted from 1 to 4 days; however, one adult female was reported to remain in upland habitat for 50 days (Tatarian 2008). Upland refugia closer to aquatic sites were used more often and were more commonly associated with areas exhibiting

higher object cover, e.g., woody debris, rocks, and vegetative cover. Subterranean cover was not significantly different between occupied upland habitat and non-occupied upland habitat.

California red-legged frogs are often prolific breeders, laying their eggs during or shortly after large rainfall events in late winter and early spring (Hayes and Miyamoto 1984). Egg masses containing 2,000 to 5,000 eggs are attached to vegetation below the surface and hatch after 6 to 14 days (Storer 1925, Jennings and Hayes 1994). In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity (Jennings *et al.* 1992). Eggs exposed to salinity levels greater than 4.5 parts per thousand resulted in 100 percent mortality (Jennings and Hayes 1990). Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae. Larvae undergo metamorphosis 3½ to 7 months following hatching and reach sexual maturity 2 to 3 years of age (Storer 1925; Wright and Wright 1949; Jennings and Hayes 1985, 1990, 1994). Of the various life stages, larvae probably experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis (Jennings *et al.* 1992). California red-legged frogs may live 8 to 10 years (Jennings *et al.* 1992). Populations can fluctuate from year to year; favorable conditions allow the species to have extremely high rates of reproduction and thus produce large numbers of dispersing young and a concomitant increase in the number of occupied sites. In contrast, the animal may temporarily disappear from an area when conditions are stressful (e.g., during periods of drought, disease, etc.).

The diet of California red-legged frogs is highly variable and changes with the life history stage. The diet of the larvae is not well studied, but is likely similar to that of other ranid frogs which feed on algae, diatoms, and detritus by grazing on the surface of rocks and vegetation (Fellers 2005; Kupferberg 1996a, 1996b, 1997). Hayes and Tennant (1985) analyzed the diets of California red-legged frogs from Cañada de la Gaviota in Santa Barbara County during the winter of 1981 and found invertebrates (comprising 42 taxa) to be the most common prey item consumed; however, they speculated that this was opportunistic and varied based on prey availability. They ascertained that larger frogs consumed larger prey and were recorded to have preyed on Pacific chorus frog, three-spined stickleback and, to a limited extent, California mice, which were abundant at the study site (Hayes and Tennant 1985, Fellers 2005). Although larger vertebrate prey was consumed less frequently, it represented over half of the prey mass eaten by larger frogs suggesting that such prey may play an energetically important role in their diets (Hayes and Tennant 1985). Juvenile and subadult/adult frogs varied in their feeding activity periods; juveniles fed for longer periods throughout the day and night, while subadult/adults fed nocturnally (Hayes and Tennant 1985). Juveniles were significantly less successful at capturing prey and all life history stages exhibited poor prey discrimination, feeding on several inanimate objects that moved through their field of view (Hayes and Tennant 1985).

Threats: Habitat loss, non-native species introduction, and urban encroachment are the primary factors that have adversely affected the California red-legged frog throughout its range. Several researchers in central California have noted the decline and eventual local disappearance of California and northern red-legged frogs in systems supporting bullfrogs (Jennings and Hayes 1990; Twedt 1993), red swamp crayfish, signal crayfish, and several species of warm water fish including sunfish, goldfish, common carp, and mosquitofish (Moyle 1976; Barry 1992; Hunt 1993; Fisher and Schaffer 1996). This has been attributed to predation, competition, and

reproduction interference. Twedt (1993) documented bullfrog predation of juvenile northern red-legged frogs, and suggested that bullfrogs could prey on subadult California red-legged frogs as well. Bullfrogs may also have a competitive advantage over California red-legged frogs. For instance, bullfrogs are larger and possess more generalized food habits (Bury and Whelan 1984). In addition, bullfrogs have an extended breeding season (Storer 1933) during which an individual female can produce as many as 20,000 eggs (Emlen 1977). Furthermore, bullfrog larvae are unpalatable to predatory fish (Kruse and Francis 1977). Bullfrogs also interfere with California red-legged frog reproduction by eating adult male California red-legged frogs. Both California and northern red-legged frogs have been observed in amplexus (mounted on) with both male and female bullfrogs (Jennings and Hayes 1990; Twedt 1993; Jennings 1993). Thus bullfrogs are able to prey upon and out-compete California red-legged frogs, especially in sub-optimal habitat.

The urbanization of land within and adjacent to California red-legged frog habitat has also affected the threatened amphibian. These declines are attributed to channelization of riparian areas, enclosure of the channels by urban development that blocks dispersal, and the introduction of predatory fishes and bullfrogs. Diseases may also pose a significant threat, although the specific effects of disease on the California red-legged frog are not known. Pathogens are suspected of causing global amphibian declines (Davidson *et al.* 2003). Chytridiomycosis and ranaviruses are a potential threat because these diseases have been found to adversely affect other amphibians, including the listed species (Davidson *et al.* 2003; Lips *et al.* 2006). Mao *et al.* (1999 cited in Fellers 2005) reported northern red-legged frogs infected with an iridovirus, which was also presented in sympatric threespine sticklebacks in northwestern California. Non-native species, such as bullfrogs and non-native tiger salamanders that live within the range of the California red-legged frog have been identified as potential carriers of these diseases (Garner *et al.* 2006). Humans can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers themselves (i.e., contaminated boots, waders or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, which results in the listed species being more susceptible to the effects of disease.

Recovery Plan: The recovery plan for the California red-legged frog identifies eight recovery units (Service 2002). The establishment of these recovery units is based on the determination that various regional areas of the species' range are essential to its survival and recovery. These recovery units are delineated by major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of its range. The goal of the recovery plan is to protect the long-term viability of all extant populations within each recovery unit. Within each recovery unit, core areas have been delineated and represent contiguous areas of moderate to high California red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations. Thus when combined with suitable dispersal habitat, will allow for the long term viability within existing populations. The management strategy identified within the Recovery Plan will allow for the recolonization of habitats within and adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of California red-legged frogs.

California Red-Legged Frog Critical Habitat

The Service designated critical habitat for the California red-legged frog on April 13, 2006 (Service 2006b) and a revised designation to the critical habitat was published on March 17, 2010 (Service 2010). At this time, the Service recognized the taxonomic change from *Rana aurora draytonii* to *Rana draytonii* (Shaffer *et al.* 2010). Critical habitat is defined in Section 3 of the Act as: (1) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (a) essential to the conservation of the species and (b) that may require special management considerations or protection and; (2) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. In determining which areas to designate as critical habitat, the Service considers those physical and biological features that are essential to a species' conservation and that may require special management considerations or protection (50 CFR 424.12(b)). The Service is required to list the known PCEs together with the critical habitat description. Such physical and biological features include, but are not limited to, the following: (1) space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, rearing of offspring, or dispersal and; (5) generally, habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

The PCEs defined for the California red-legged frog were derived from its biological needs. The area designated as revised critical habitat provides aquatic habitat for breeding and non-breeding activities and upland habitat for shelter, foraging, predator avoidance, and dispersal across its range. The PCEs and, therefore, the resulting physical and biological features essential for the conservation of the species were determined from studies of California red-legged frog ecology. Based on the above needs and our current knowledge of the life history, biology, and ecology of the species, and the habitat requirements for sustaining the essential life-history functions of the species, the Service determined that the PCEs essential to the conservation of the California red-legged frog are: (1) aquatic breeding habitat defined as standing bodies of fresh water (with salinities less than 7.0 parts per thousand), including: natural and manmade (e.g., stock) ponds, slow-moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years; (2) non-breeding aquatic habitat defined as freshwater and wetted riparian habitats, as described above, that may not hold water long enough for the subspecies to hatch and complete its aquatic life cycle but that do provide for shelter, foraging, predator avoidance, and aquatic dispersal for juvenile and adult California red-legged frogs. Other wetland habitats that would be considered to meet these elements include, but are not limited to: plunge pools within intermittent creeks; seeps; quiet water refugia during high water flows; and springs of sufficient flow to withstand the summer dry period; (3) upland habitat defined as upland areas adjacent to or surrounding breeding and non-breeding aquatic and riparian habitat up to a distance of 1 mile in most cases and comprised of various vegetational series such as grasslands, woodlands, wetland, or riparian plant species that provides the frog shelter, forage, and predator avoidance. Upland features are also essential in that they are needed to maintain the

hydrologic, geographic, topographic, ecological, and edaphic features that support and surround the wetland or riparian habitat. These upland features contribute to the filling and drying of the wetland or riparian habitat and are responsible for maintaining suitable periods of pool inundation for larval frogs and their food sources, and provide breeding, non-breeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat should include structural features such as boulders, rocks and organic debris (e.g., downed trees, logs), as well as small mammal burrows and moist leaf litter and; (4) dispersal habitat defined as accessible upland or riparian dispersal habitat within designated units and between occupied locations within a minimum of 1 mile of each other and that allows for movement between such sites. Dispersal habitat includes various natural habitats and altered habitats such as agricultural fields, which do not contain barriers (e.g., heavily traveled road without bridges or culverts) to dispersal. Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large reservoirs over 50 acres in size, or other areas that do not contain those features identified in PCEs 1, 2, or 3 as essential to the conservation of the subspecies.

With the revised designation of critical habitat, the Service intends to conserve the geographic areas containing the physical and biological features that are essential to the conservation of the species, through the identification of the appropriate quantity and spatial arrangement of the PCEs sufficient to support the life-history functions of the species. Not all life-history functions require all the PCEs and not all areas designated as critical habitat will contain all the PCEs. Refer to the final designation of critical habitat for California red-legged frog for additional information.

Central California Tiger Salamander

Listing Status: On May 23, 2003, we proposed to list the Central California DPS of the tiger salamander as threatened. At that time, we also proposed reclassification of the Santa Barbara County DPS and Sonoma County DPS from endangered to threatened (68 FR 28647). In the same notice, we also proposed a special rule under section 4(d) of the Act to exempt take for routine ranching operations for the Central California DPS and, if reclassified to threatened, for the Santa Barbara and Sonoma County DPSs (68 FR 28668). On August 4, 2004, after determining that the listed Central California population of the California DPS of the Central California tiger salamander was threatened (69 FR 47211), we determined that the Santa Barbara and Sonoma County populations were threatened as well, and reclassified the Central California tiger salamander as threatened throughout its range (69 FR 47212), removing the Santa Barbara and Sonoma County populations as separately listed DPSs (69 FR 47241). In this notice, we also finalized the special rule to exempt take for routine ranching operations for the Central California tiger salamander throughout its range (69 FR 47248).

On August 18, 2005, as a result of litigation of the August 4, 2004 final rule on the reclassification of the California tiger salamander DPSs (*Center for Biological Diversity et al.* v. *United States Fish and Wildlife Service et al.*, C 04-04324 WHA [N.D. Cal. 2005]), the District Court of Northern California sustained the portion of the 2004 rule pertaining to listing the

Central California tiger salamander as threatened with a special rule, vacated the 2004 rule with regard to the Santa Barbara and Sonoma DPSs, and reinstated their prior listing as endangered. The List of Endangered and Threatened Wildlife in part 17, subchapter B of Chapter I, title 50 of the CFR has not been amended to reflect the vacatures contained in this order, and continues to show the rangewide reclassification of the California tiger salamander (salamander[s]) as a threatened species with a special rule. We are currently in the process of correcting the CFR to reflect the current status of the species throughout its range.

Species Description: The California tiger salamander is a large, stocky, terrestrial salamander with a broad, rounded snout. Recorded adult measurements have been as much as 8.2 inches long (Petranka 1998; Stebbins 2003). California tiger salamanders exhibit sexual dimorphism (differences in body appearance based on gender) with males tending to be larger than females. The coloration of the adults generally consists of random white or yellowish markings against a black body. The markings tend to be more concentrated on the lateral sides of the body; whereas other salamander species tend to have brighter yellow spotting that is heaviest on the dorsal surface.

Distribution: The California tiger salamander is endemic to California and historically inhabited the low-elevation grassland and oak savanna plant communities of the Central Valley, adjacent foothills, and Inner Coast Ranges (Jennings and Hayes 1994; Storer 1925; Shaffer *et al.* 1993). The species has been recorded from near sea level to approximately 3,900 feet in the Coast Ranges and to approximately 1,600 feet in the Sierra Nevada foothills (Shaffer and Trenham 2004). Along the Coast Ranges, the species occurred from the Santa Rosa area of Sonoma County, south to the vicinity of Buellton in Santa Barbara County. The historic distribution in the Central Valley and surrounding foothills included northern Yolo County southward to northwestern Kern County and northern Tulare County.

The Central California tiger salamander occupies the Bay Area (central and southern Alameda, Santa Clara, western Stanislaus, western Merced, and the majority of San Benito counties), Central Valley (Yolo, Sacramento, Solano, eastern Contra Costa, northeastern Alameda, San Joaquin, Stanislaus, Merced, and northwestern Madera counties), southern San Joaquin Valley (portions of Madera, central Fresno, and northern Tulare and Kings Counties), and the Central Coast Range (southern Santa Cruz, Monterey, northern San Luis Obispo, and portions of western San Benito, Fresno, and Kern counties).

Life History: The California tiger salamander has an obligate biphasic life cycle (Shaffer *et al.* 2004). Although the larvae develop in the vernal pools and ponds in which they were born, the species is otherwise terrestrial and spend most of their post-metamorphic lives in widely dispersed underground retreats (Shaffer *et al.* 2004; Trenham *et al.* 2001). Because they spend most of their lives underground, the animals rarely are encountered even in areas where California tiger salamanders are abundant. Subadult and adult California tiger salamanders typically spend the dry summer and fall months in the burrows of small mammals, such as California ground squirrels and Botta's pocket gopher (Storer 1925; Loredo and Van Vuren 1996; Petranka 1998; Trenham 1998a). Although ground squirrels have been known to eat these amphibians, the relationship with their burrowing hosts is primarily commensal (an association

that benefits one member while the other is not affected) (Loredo *et al.* 1996; Semonsen 1998).

California tiger salamanders may also use landscape features such as leaf litter or desiccation cracks in the soil for upland refugia. Burrows often harbor camel crickets and other invertebrates that provide likely prey for the amphibians. Underground refugia also provide protection from the sun and wind associated with the dry California climate that can cause excessive drying of amphibian skin. Although California tiger salamanders are members of a family of "burrowing" salamanders, they are not known to create their own burrows. This may be due to the hardness of soils in the California ecosystems in which they are found. California tiger salamanders depend on persistent small mammal activity to create, maintain, and sustain sufficient underground refugia for the species. Burrows are short lived without continued small mammal activity and typically collapse within approximately 18 months (Loredo *et al.* 1996).

Upland burrows inhabited by California tiger salamanders have often been referred to as aestivation-sites. However, "aestivation" implies a state of inactivity, while most evidence suggests that the animals remain active in their underground dwellings. One study has found that salamanders move, feed, and remain active in their burrows (Van Hattem 2004). Because adults arrive at breeding ponds in good condition and are heavier when entering the pond than when leaving, researchers have long inferred that they are feeding while underground. A number of direct observations have confirmed this (Trenham 2001; Van Hattem 2004). Thus, "upland habitat" is a more accurate description of the terrestrial areas used by California tiger salamanders.

California tiger salamanders typically emerge from their underground refugia at night during the fall or winter rainy season (November-May) to migrate to their breeding ponds (Stebbins 1985, 1989; Shaffer *et al.* 1993; Trenham *et al.* 2000). The breeding period is closely associated with the rainfall patterns in any given year with less adults migrating and breeding in drought years (Loredo and Van Vuren 1996; Trenham *et al.* 2000). Male California tiger salamander are typically first to arrive and generally remain in the ponds longer than females. Results from a 7-year study in Monterey County suggested that males remained in the breeding ponds for an average of 44.7 days while females remained for an average of only 11.8 days (Trenham *et al.* 2000). Historically, breeding ponds were likely limited to vernal pools, but now include livestock stock ponds. Ideal breeding ponds are typically fishless, free of non-native predators, and seasonal or semi-permanent (Barry and Shaffer 1994; Petranka 1998).

While in the ponds, adult California tiger salamanders mate and then the females lay their eggs in the water (Twitty 1941; Shaffer *et al.* 1993; Petranka 1998). Egg laying typically reaches a peak in January (Loredo and Van Vuren 1996; Trenham *et al.* 2000). Females attach their eggs singly, or in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris (Storer 1925; Twitty 1941). Eggs are often attached to objects, such as rocks and boards in ponds with no or limited vegetation (Jennings and Hayes 1994). Clutch sizes from a Monterey County study had an average of 814 eggs (Trenham *et al.* 2000). Seasonal pools may not exhibit sufficient depth, persistence, or other necessary parameters for adult breeding during times of drought (Barry and Shaffer 1994). After breeding and egg laying is complete, adults leave the pool and return to their upland refugia (Loredo *et al.* 1996; Trenham 1998a). Adult California

tiger salamanders often continue to emerge nightly for approximately the next two weeks to feed amongst their upland habitat (Shaffer *et al.* 1993).

California tiger salamander larvae typically hatch within 10 to 24 days after eggs are laid (Storer 1925). The larvae are totally aquatic and range in length from approximately 0.45 to 0.56 inches (Petranka 1998). They have yellowish gray bodies, broad fat heads, large, feathery external gills, and broad dorsal fins that extend well up their back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about six weeks after hatching, after which they switch to larger prey (J. Anderson 1968). Larger larvae have been known to consume the tadpoles of Pacific tree frogs, western spadefoot toads, and California red-legged frogs (J. Anderson 1968; P. Anderson 1968). California tiger salamander larvae are among the top aquatic predators in seasonal pool ecosystems. When not feeding, they often rest on the bottom in shallow water but are also found throughout the water column in deeper water. Young California tiger salamanders are wary and typically escape into vegetation at the bottom of the pool when approached by potential predators (Storer 1925).

The California tiger salamander larval stage is typically completed in 3 to 6 months with most metamorphs entering upland habitat during the summer (Petranka 1998). In order to be successful, the aquatic phase of this species' life history must correspond with the persistence of its seasonal aquatic habitat. Most seasonal ponds and pools dry up completely during the summer. Amphibian larvae must grow to a critical minimum body size before they can metamorphose (change into a different physical form) to the terrestrial stage (Wilbur and Collins 1973). Larval development and metamorphosis can vary and is often site-dependent. Larvae collected near Stockton in the Central Valley during April varied between 1.88 to 2.32 inches in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left breeding pools 60 to 94 days after eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. Longer ponding duration typically results in larger larvae and metamorphosed juveniles that are more likely to survive and reproduce (Pechmann *et al.* 1989; Semlitsch *et al.* 1988; Morey 1998; Trenham 1998b). Larvae will perish if a breeding pond dries before metamorphosis is complete (P. Anderson 1968; Feaver 1971). Pechmann *et al.* (1989) found a strong positive correlation between ponding duration and total number of metamorphosing juveniles in five salamander species. In Madera County, Feaver (1971) found that only 11 of 30 sampled pools supported larval salamanders, and 5 of these dried before metamorphosis could occur. Therefore, out of the original 30 pools, only 6 (20 percent) provided suitable conditions for successful reproduction that year. Size at metamorphosis is positively correlated with stored body fat and survival of juvenile amphibians, and negatively correlated with age at first reproduction (Semlitsch *et al.* 1988; Scott 1994; Morey 1998).

Following metamorphosis, juvenile California tiger salamanders leave their pools and move to upland habitat. This emigration can occur in both wet and dry conditions (Loredo and Van Vuren 1996; Loredo *et al.* 1996). Wet conditions are more favorable for upland travel but summer rain events seldom occur as metamorphosis is completed and ponds begin to dry. As a result, juveniles may be forced to leave their ponds on rainless nights. Under dry conditions, juveniles may be limited to seeking upland refugia in close proximity to their aquatic larval pool. These individuals often wait until the next winter's rains to move further into more suitable

upland refugia. The peak emergence of these metamorphs in ponds is typically between mid-June and mid-July (Loredo and Van Vuren 1996; Trenham et al. 2000). Juveniles remain active in their upland habitat, emerging from underground refugia during rainfall events to disperse or forage (Trenham and Shaffer 2005). Depending on location and other development factors, metamorphs will not return as adults to aquatic breeding habitat for 2 to 5 years (Loredo and Van Vuren 1996; Trenham *et al.* 2000).

Reproductive success for the California tiger salamander is low. Results from one study suggest that the average female bred 1.4 times over their lifespan and produced 8.5 young per reproductive effort that survived to metamorphosis (Trenham *et al.* 2000). This resulted in the output of roughly 11 metamorphic offspring over a breeding female's lifetime. The primary reason for low reproductive success may be that this relatively short-lived species requires two or more years to become sexually mature (Shaffer *et al.* 1993). Some individuals may not breed until they are 4 to 6 years old. While California tiger salamanders may survive for more than 10 years, many breed only once, and in one study, less than 5 percent of marked juveniles survived to become breeding adults (Trenham 1998b). With such low recruitment, isolated populations are susceptible to unusual, randomly occurring natural events as well human-caused factors that reduce breeding success and individual survival. Factors that repeatedly lower breeding success in isolated pools can quickly extirpate a population.

Dispersal and migration movements made by California tiger salamanders can be grouped into two main categories: (1) breeding migration; and (2) interpond dispersal. Breeding migration is the movement of salamanders to and from a pond from the surrounding upland habitat. After metamorphosis, juveniles move away from breeding ponds into the surrounding uplands, where they live continuously for several years. At a study in Monterey County, it was found that upon reaching sexual maturity, most individuals returned to their natal/ birth pond to breed, while 20 percent dispersed to other ponds (Trenham *et al.* 2001). After breeding, adult California tiger salamanders return to upland habitats, where they may live for one or more years before attempting to breed again (Trenham *et al.* 2000).

California tiger salamanders are known to travel long distances between breeding ponds and their upland refugia. Generally it is difficult to establish the maximum distances traveled by any species, but salamanders in Santa Barbara County have been recorded dispersing up to 1.3 miles from their breeding ponds (Sweet 1998). As a result of a 5-year capture and relocation study in Contra Costa County, Orloff (2011) estimated that captured California tiger salamanders were traveling a minimum of 0.5 miles to the nearest breeding pond and that some individuals were likely traveling more than 1.3 miles to and from breeding ponds. California tiger salamanders are also known to travel between breeding ponds. One study found that 20 to 25 percent of the individuals captured at one pond were recaptured later at other ponds approximately 1,900 and 2,200 feet away (Trenham *et al.* 2001). In addition to traveling long distances during juvenile dispersal and adult migration, salamanders may reside in burrows far from their associated breeding ponds.

Although previously cited information indicates that California tiger salamanders can travel long distances, they typically remain close to their associated breeding ponds. A trapping study

conducted in Solano County during the winter of 2002/2003 suggested that juveniles dispersed and used upland habitats further from breeding ponds than adults (Trenham and Shaffer 2005). More juvenile California tiger salamanders were captured in traps placed at 328, 656, and 1,312 feet from a breeding pond instead of 164 feet. Approximately 20 percent of the captured juveniles were found at least 1,312 feet from the nearest breeding pond. The associated distribution curve suggested that 95 percent of juvenile California tiger salamanders were within 2,099 feet of the pond, with the remaining 5 percent being found at even greater distances. Preliminary results from the 2003-04 trapping efforts at the same study site detected juvenile California tiger salamanders at even further distances, with a large proportion of the captures at 2,297 feet from the breeding pond (Trenham 1998a). Surprisingly, most juveniles captured, even those at 2,100 feet, were still moving away from ponds. In Santa Barbara County, juvenile Santa Barbara County DPS California tiger salamanders have been trapped approximately 1,200 feet away while dispersing from their natal pond (Science Applications International Corporation, unpublished data). This data shows that many California tiger salamanders travel far while still in the juvenile stage. Post-breeding movements away from breeding ponds by adults appear to be much smaller. During post-breeding emigration from aquatic habitat, radio-equipped adult California tiger salamanders were tracked to burrows between 62 to 813 feet from their breeding ponds (Trenham 2001). These reduced movements may be due to adult California tiger salamanders exiting the ponds with depleted physical reserves, or drier weather conditions typically associated with the post-breeding upland migration period.

California tiger salamanders are also known to use several successive burrows at increasing distances from an associated breeding pond. Although previously cited studies provide information regarding linear movement from breeding ponds, upland habitat features appear to have some influence on movement. Trenham (2001) found that radio-tracked adults were more abundant in grasslands with scattered large oaks, than in more densely wooded areas. Based on radio-tracked adults, there is no indication that certain habitat types are favored as terrestrial movement corridors (Trenham 2001). In addition, captures of arriving adults and dispersing new metamorphs were evenly distributed around two ponds completely encircled by drift fences and pitfall traps. Thus, it appears that dispersal into the terrestrial habitat occurs randomly with respect to direction and habitat types.

Threats: The Central California tiger salamander is imperiled throughout its range due to a variety of human activities (Service 2004). Current factors associated with declining Central California tiger salamander populations include continued habitat loss and degradation due to agriculture and urbanization; hybridization with the non-native eastern tiger salamander (*Ambystoma tigrinum*) (Fitzpatrick and Shaffer 2004; Riley *et al.* 2003); and predation by introduced species. Central California tiger salamander populations are likely threatened by multiple factors but continued habitat fragmentation and colonization of non-native salamanders may represent the most significant current threats. Habitat isolation and fragmentation within many watersheds have precluded dispersal between sub-populations and threatened the viability of metapopulations (broadly defined as multiple subpopulations that occasionally exchange individuals through dispersal, and are capable of colonizing or "rescuing" extirpated habitat patches). Other threats include disease, predation, interspecific competition, urbanization and population growth, exposure to contaminants, rodent and mosquito control, road-crossing

mortality, and hybridization with non-native salamanders. Currently, these various primary and secondary threats are largely not being offset by existing Federal, State, or local regulatory mechanisms. The Central California tiger salamander is also prone to chance environmental or demographic events, to which small populations are particularly vulnerable.

The Bay Area is located within the Central Coast and Livermore vernal pool regions (Keeler-Wolf *et al.* 1998). Most of the vernal pools in the Livermore Region in Alameda County have been destroyed or degraded by urban development, agriculture, water diversions, poor water quality, and long-term overgrazing (Keeler-Wolf *et al.* 1998). During the 1980s and 1990s, vernal pools were lost at a 1.1 percent annual rate in Alameda County (Holland 1998).

Due to the extensive losses of vernal pool complexes and their limited distribution in the Bay Area region, many Central California tiger salamander breeding sites consist of artificial water bodies. Overall, 82 percent (94) of the identified water bodies from the California Natural Diversity Database (CNDDB) Central California tiger salamander occurrences in Alameda County are stock, farm, or berm ponds used by cattle grazing and/or as a temporary water source for small farm irrigation (CDFG 2011). Without long-term maintenance (sediment removal, berm maintenance, etc.), the longevity of artificial breeding habitats is uncertain relative to naturally occurring vernal pools that are dependent on the continuation of seasonal weather patterns (Shaffer in litt. 2003).

Shaffer *et al.* (1993) found that the East Bay counties of Alameda and Contra Costa supported the greatest concentrations of Central California tiger salamander. Central California tiger salamander populations in the Livermore Valley are severely threatened by the ongoing conversion of grazing land to subdivisions and vineyards (Stebbins 2003). Central California tiger salamanders are under increasing pressure from habitat conversion and urbanization, development (i.e. Dublin Ranch, Fallon Village, Fallon Sports Park, Staples Ranch, and Shea Center Livermore, vineyards), and infrastructure, utility and safety improvement projects (i.e. I-580 Eastbound HOV, I-580/Isabel Avenue Interchange, and I-580/Charro Avenue Interchange). The species' low recruitment and high juvenile mortality makes it particularly susceptible to habitat loss, fragmentation, urbanization, and construction related harm and mortality.

California Tiger Salamander Critical Habitat

The Service designated critical habitat for the Central California tiger salamander on August 23, 2005 (Service 2005c). The rule identifies approximately 199,109 acres in 19 counties in California.

Based on our current knowledge of the life history, biology, and ecology of the species and the relationship of its essential life history functions to its habitat, the Service determined that the Central population of the California tiger salamander requires the following PCEs: (1) standing bodies of fresh water (including natural and manmade (e.g., stock)) ponds, vernal pools, and other ephemeral or permanent water bodies which typically support inundation during winter rains and hold water for a minimum of 12 weeks in a year of average rainfall; (2) upland habitats adjacent and accessible to and from breeding ponds that contain small mammal burrows or other

underground habitat that California tiger salamanders depend upon for food, shelter, and protection from the elements and predation; and (3) accessible upland dispersal habitat between occupied locations that allow for movement between such sites. Refer to the final designation of critical habitat for additional information.

Alameda Whipsnake

Refer to the *Alameda Whipsnake (Masticophis lateralis euryxanthus) 5-Year Review: Summary and Evaluation* (Service 2011) for the current Status of the Species.

Alameda Whipsnake Critical Habitat

On October 2, 2006, the final rule determining critical habitat for the Alameda whipsnake was published in the **Federal Register** (Service 2006c). The rule identifies approximately 154,834 acres within six critical habitat units in Alameda, Contra Costa, Santa Clara, and San Joaquin counties, California.

Based on our current knowledge of the life history, biology, and ecology of the Alameda whipsnake and the requirements of the habitat necessary to sustain the essential life history functions of the subspecies, we have determined that the PCEs for the Alameda whipsnake are: (1) scrub/shrub communities with a mosaic of open and closed canopy: Scrub/shrub vegetation dominated by low-to medium-stature woody shrubs with a mosaic of open and closed canopy as characterized by the chamise, chamise-eastwood manzanita, chaparral whitethorn, and interior live oak shrub vegetation series (as identified in the Manual of California Vegetation (Sawyer and Keeler-Wolf 1995), A Guide to Wildlife Habitats of California ((Mayer and Laudenslayer 1988), and California Wildlife Habitat Relationship System (CDFG 1998)), occurring at elevations from sea level to approximately 3,850 feet. Such scrub/shrub vegetation within these series forms a pattern of open and closed canopy used by the Alameda whipsnake for shelter from predators; temperature regulation, because it provides sunny and shady locations; prey-viewing opportunities; and nesting habitat and substrate. These features contribute to support a prey base consisting of western fence lizards and other prey species such as skinks, frogs, snakes, and birds; (2) woodland or annual grassland plant communities contiguous to lands containing PCE 1: Woodland or annual grassland vegetation series comprised of one or more of the following: blue oak, coast live oak, California bay, California buckeye, and California annual grassland vegetation series (as identified in the Manual of California Vegetation (Sawyer and Keeler-Wolf 1995), A Guide to Wildlife Habitats of California (Mayer and Laudenslayer 1988), and California Wildlife Habitat Relationship System (CDFG 1998)) are PCE 2. This mosaic of vegetation is essential to the conservation of the Alameda whipsnake because it supports a prey base, consisting of western fence lizards and other prey species such as skinks, frogs, snakes, and birds. This provides opportunities for foraging by allowing snakes to come in contact with and visualize, track, and capture prey (especially western fence lizards along with other prey such as skinks, frogs, birds); short and long distance dispersal within, between, or to adjacent areas containing essential features (i.e., PCE 1 or PCE 3); and contact with other Alameda whipsnakes for mating and reproduction; and (3) lands containing rock outcrops, talus, and small mammal burrows within or adjacent to PCE 1 and or PCE 2. These areas are essential to the conservation

of the Alameda whipsnake because they are used for retreats (shelter), hibernacula, foraging, and dispersal, and provide additional prey population support functions. Refer to the final designation of critical habitat for additional information.

San Joaquin Kit Fox

Refer to the San *Joaquin Kit Fox (Vulpes macrotis mutica) 5-Year Review: Summary and Evaluation* (Service 2010b) for the current Status of the Species.

Palmate-Bracted Bird's-Beak

Refer to the *Palmate-bracted bird's-beak (Cordylanthus palmatus = Chloropyron palmatum) 5-Year Review: Summary and Evaluation* (Service 2009b) for the current Status of the Species.

Environmental Baseline

Urban

The Conservation Strategy Study Area encompasses 271,485 acres in eastern Alameda County, California. The cities of Dublin, Livermore, and Pleasanton are completely included in the Conservation Strategy Study Area and a portion of the cities of Fremont, Union City, and Hayward are included in the Alameda Creek watershed boundary. Located between the urban areas surrounding the San Francisco Bay and the Central Valley, east Alameda County has had considerable growth pressure in the recent past. In 1990, the population was approximately 133,000 and will most likely exceed 250,000 by 2010, representing an 88 percent growth (Alameda County Community Development Agency 2002 as cited in the Conservation Strategy (ICF International 2010)). The Association of Bay Area Governments has projected that the populations of Livermore, Pleasanton, and Dublin will grow to 89,600; 75,300; and 56,800 by the year 2015, and 95,500; 79,100; and 62,700 by the year 2020, respectively (Association of Bay Area Governments 2006 as cited in the Conservation Strategy (ICF International 2010)).

Alameda County has an urban growth boundary via voter approved Measure D and the general plans of the cities of Livermore, Pleasanton, and Dublin have designated urban growth boundaries. Development, however, is not precluded from occurring outside of the urban growth boundaries. In general, development outside of an urban growth boundary requires an amendment to a general plan.

Open Space

In east Alameda County, California Department of Parks and Recreation owns Bethany Reservoir State Recreation Area (802 acres), Carnegie State Vehicular Recreation Area (3,850 acres), and Lake Del Valle State Recreation Area (5,005 acres) (State of California 2008 as cited in the Conservation Strategy and Figure 2-3 of the Conservation Strategy (ICF International 2010)). Bethany Reservoir is the northern terminus of the California Aqueduct. The associated Bethany Reservoir State Recreation Area provides opportunities for water recreation, including fishing

and windsurfing as well as biking along the California Aqueduct Bikeway. Carnegie State Vehicular Recreation Area is located on the eastern edge of the study area and straddles the Alameda/San Joaquin County line. The park provides active motorized riding areas on a diversity of terrain ranging from rolling hills to steep canyons. Lake Del Valle State Recreation Area surrounds Lake Del Valle and provides hiking, horseback riding, and water recreation. It is also the eastern gateway to the 28-mile Ohlone Trail and is operated by East Bay Regional Park District (EBRPD).

EBRPD manages regional parks, regional preserves, and trails in the Conservation Strategy Study Area. Regional parks in the Conservation Strategy Study Area are Del Valle Regional Park (5,005 acres), Pleasanton Ridge Regional Park (3,387 acres), and Vargas Plateau Regional Park (1,043 acres) (Figure 2-3 of the Conservation Strategy (ICF International 2010)). A regional park must be at least 500 acres, including land and water, and must include scenic or natural resources in at least 70 percent of the park area and have the capacity to accommodate a range of recreational activities, as long as recreational areas are less than 30 percent of the overall park area (EBRPD 1997). Regional preserves in the Conservation Strategy Study Area are Sunol Regional Wilderness (6,881 acres), Ohlone Regional Wilderness (8,714 acres), Brushy Peak Regional Preserve (406 acres), and Mission Peak Regional Preserve (470 acres) (Figure 2-3 of the Conservation Strategy (ICF International 2010)). The primary objective of a regional preserve is to preserve and protect significant natural or cultural resources.

Lawrence Livermore National Laboratory owns and operates Site 300, located in eastern Alameda and western San Joaquin Counties north of Corral Hollow Road (Figure 2-3 of the Conservation Strategy (ICF International 2010)), for the purpose of conducting unique scientific experiments and explosive tests. The site is approximately 7,000 acres in size, 803 acres of which is in the Conservation Strategy Study Area. Site 300 is inhabited by a diverse assemblage of flora and fauna and less than 5 percent of the property-area is developed. Developed areas with buildings are generally separated from wildland settings with high-security fences.

Within the Conservation Strategy Study Area, Livermore Area Recreational and Park District (LARPD) currently owns and operates two open space parks: Sycamore Grove Park/Veterans Park (774 acres) and Holdener Park (55 acres); and one open space preserve, Garaventa Wetlands Preserve (24 acres). LARPD owns 507 acres of Brushy Peak Regional Preserve (the remainder is owned by EBRPD), but the entire preserve is managed by EBRPD. Overall, LARPD parks and preserves represent 1,360 acres of natural open space and also owns and manages several trail facilities (LARPD 2008 as cited in the Conservation Strategy (ICF International 2010)).

The San Francisco Public Utilities Commission (SFPUC) owns, leases, and manages 23,000 acres of watershed lands located in Conservation Strategy Study Area (Figure 2-3 of the Conservation Strategy (ICF International 2010)) in the Alameda Watershed. The remaining 13,000 acres occur in Santa Clara County. While the primary purpose of SFPUC watershed lands is for watershed protection, the agency also uses the watershed lands for several other purposes, including quarry operations, plant nurseries, utilities routing, and water conveyance.

The entire area provides habitat for a variety of wildlife and is managed under a grazing management plan to enhance native flora and fauna.

The Tri-Valley Conservancy oversees conservation easements and manages lands in eastern Alameda County, including north and south Livermore, south Pleasanton, west Altamont Hills area, and the future Chain of Lakes Recreation Area. The purpose of the Tri-Valley Conservancy is "to permanently protect the fertile soils, rangelands, open space, and biological resources and to support a viable agricultural economy in the Tri Valley Area" (Tri-Valley Conservancy 2005 as cited in the Conservation Strategy (ICF International 2010)). The Tri-Valley Conservancy protects lands through acquisitions, conservation easements, deed restrictions, conditional transfers, reverter clauses, management agreements, leases, mutual covenants, and donations. The Tri-Valley Conservancy also has ongoing stewardship programs for acquired lands.

The Conservation Strategy Study Area contains thousands acres of private agriculture and rangeland. Most of this land is either in vineyards, used for livestock production, or is in dry land farming. The Conservation Strategy Agriculture and Rangelands land use planning category comprises 167,449 acres (approximately 61.7 percent) of the Conservation Strategy Study Area. Rangeland in the northeastern portion of Alameda County also falls within the Wind Resource Area and many private ranches have existing wind energy facilities.

Please refer to Chapter 2-Evironmental Setting of the Conservation Strategy (ICF International 2010) for more information on the general physical, biological and habitat based resources, and land use within the Conservation Strategy Study Area.

Longhorn Fairy Shrimp

Threats to longhorn fairy shrimp in the action area include wind energy, habitat alteration and degradation as a result of development and changes to natural hydrology, recreational activities (e.g., off-highway vehicles and hiking), erosion, contamination, environmental disturbances, including severe drought, degradation of habitat from invasive weedy plant species, inappropriate grazing regimes, and other unforeseen events (Service 2005b, 2007a).

All of the known localities of this species in the Conservation Strategy Study Area are within the Brushy Peak Preserve and are currently protected (Service 2007a). The Brushy Peak Preserve contains one of the four known populations of longhorn fairy shrimp. The Brushy Peak Preserve is within one of the five Altamont Hills Core Recovery Areas in the Livermore Vernal Pool Region. General recovery criteria include: (1) habitat protection; (2) adaptive management and monitoring; (3) status surveys; (4) research; and (5) participation and outreach. The recovery plan established the following criteria for downlisting the longhorn fairy shrimp in the Altamont Hills Core Recovery Areas: (1) 100 percent protection of known occurrences range-wide and (2) 95 percent protection of suitable habitat in this core area.

Informal monitoring of known populations of fairy shrimp has occurred within the Brushy Peak Preserve. There are several vernal pools that have longhorn fairy shrimp within the 507-acre Brushy Peak Preserve, which is owned by the LARPD and managed by the EBRPD (Steve

Bobzien, personal communication, 2007 as cited in Service 2007a). The exact number of vernal pools within this preserve containing this species has not been quantified. The Brushy Peak Preserve contains rock outcrops with multiple indentations that seasonally pool water and support longhorn fairy shrimp. The number of pools supporting longhorn fairy shrimp varies from year to year (Steve Bobzien, personal communication, 2007 as cited in Service 2007a).

There is also potential for longhorn fairy shrimp to occur in unprotected areas that have not been surveyed for fairy shrimp species, particularly in areas south of the Brushy Peak Preserve (Service 2007a). The Conservation Strategy has modeled areas of suitable habitat within Conservation Zones 2, 4, 5, 6, 7, and 9. However, some habitat may have been too small to be mapped and not captured in the model.

The Service has determined it is reasonable to conclude the longhorn fairy shrimp inhabits the action area based on the recent observations of this animal the biology and ecology of the species, and the presence of suitable habitat.

Longhorn Fairy Shrimp Critical Habitat

Longhorn fairy shrimp critical habitat Unit 1B is located within Conservation Zones 5 and 6 in the Conservation Strategy Study Area. Unit 1A in Contra Costa and Unit 1B in Alameda County combine for a total of 791 acres. Approximately 133 acres occur in Conservation Zone 5 and 354 acres in Conservation Zone 6 for a total of 487 acres in Unit 1B. Of those, approximately 133 acres in Conservation Zone 5 and 134 acres in Conservation Zone 5 are unprotected. This unit was known to be occupied by longhorn fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). These features of the critical habitat, which are present in Unit 1B, are essential to the recovery of the species.

Vernal Pool Fairy Shrimp

Threats to vernal pool fairy shrimp in the action area include habitat loss in the form of habitat alteration and degradation as a result of development, agricultural conversion, and changes to natural hydrology, invasive species, incompatible grazing regimes, including insufficient grazing for prolonged periods; recreational activities (e.g., off-highway vehicles and hiking), erosion, and contamination (Service 2005b, 2007b).

The Conservation Strategy Study Area contains two of the five Altamont Hills Core Recovery Areas and is in the Livermore Vernal Pool Region. The two Core Areas are located in the Springtown Preserve area in Livermore and within the Brushy Peak Preserve in Conservation Zones 4, 5, and 6. The Brushy Peak Preserve contains known occurrences of vernal pool fairy shrimp in small rock pools on sandstone outcrops (Service 2007b). General recovery criteria include: (1) habitat protection; (2) adaptive management and monitoring; (3) status surveys; (4)

research; and (5) participation and outreach. The recovery plan established the following criteria for delisting the vernal pool fairy shrimp in the Altamont Hills Core Recovery Areas: (1) 80 percent protection of known occurrences range-wide and (2) 85 percent protection of suitable habitat in this core area.

The CNDDB lists four vernal pool fairy shrimp occurrences within the Conservation Strategy Study Area (three in Livermore and one east of Livermore) (CDFG 2011). However, through section 7 consultations the Service is aware of additional occurrences within the Conservation Strategy Study Area. Some of these occurrences are located in man-made ditches and roadside depressions, as well as in vernal pools and seasonal wetlands.

The Conservation Strategy has modeled areas of suitable habitat within Conservation Zones 2, 4, 5, 6, 7, and 9. However, some habitat may have been too small to be mapped and not captured in the model.

The Service has determined it is reasonable to conclude the vernal pool fairy shrimp inhabits the action area based on the recent observations of this animal the biology and ecology of the species, and the presence of suitable habitat.

Vernal Pool Fairy Shrimp Critical Habitat

The vernal pool fairy shrimp Altamont Hills critical habitat unit is comprised of three subunits (19A–19C), located in the general vicinity of Mount Diablo and Morgan Territory Regional Park, and comprises approximately 7,892 acres in Contra Costa and Alameda Counties. Vernal pool fairy shrimp critical habitat Unit 19C is located within Conservation Zones 4 and 5 in the Conservation Strategy Study Area. Approximately 1,378 acres occur in Conservation Zone 4 and 77 acres in Conservation Zone 5 for a total of 1455 acres in Unit 19C. Of those, approximately 892 acres in Conservation Zone 4 and 60 acres in Conservation Zone 5 are unprotected. This unit was known to be occupied by vernal pool fairy shrimp at the time of listing, is currently occupied, and contains the following vernal pool and associated upland features that are essential for the conservation of the species: mound and inter-mound topography (PCE 1, PCE 2) within a matrix of surrounding upland habitat which provide for cyst dispersal and adequate pool hydroperiods, and vernal pool wetland features within a matrix of upland habitat which provide for food, shelter, hatching, growth, and reproduction (PCE 3, PCE 4). These features of the critical habitat, which are present at the site, are essential to the recovery of the species.

Callippe Silverspot Butterfly

Threats to callippe silverspot butterflies in the action area include illegal collection, habitat loss and degradation from human activities, including off-road vehicle use, trampling by hikers and horses, inappropriate levels of grazing, fire suppression, pesticide use, air pollution, and invasive exotic vegetation (Service 2009a)

The callippe silverspot butterfly is found exclusively within grassy hills surrounding San

Francisco Bay that support its native host-plant, *Viola pedunculata* (California golden violet or Johnny jump-up) (Service 2009a). The Conservation Strategy has mapped potential habitat for the callippe silverspot butterfly in all Conservation Zones excluding Conservation Zones 6, 7, and 10.

Populations within the Conservation Strategy Study Area have been observed; however, their taxonomic status as *S. c. callippe* has not been verified, according the 5-Year Review (Service 2009a). These include a population in the hills in the City of Pleasanton (Mattoon in litt. 1992; LSA Associates 2002) and a population along the watershed to the east of Calaveras Reservoir (just east of the city of Milpitas) (Arnold 2004a, b). Dr. Arnold noted that the individuals from the Calaveras reservoir population displayed morphological characteristics intermediate between the callippe silverspot butterfly and Comstock's silverspot butterfly (*S. c. comstocki*); however, Dr. Arnold judged this population was closer in appearance to the callippe silverspot butterfly (Arnold 2004a, b). Another population was identified with similar intermediate morphological characteristics in the proposed second phase of the Ohlone Preserve Conservation Bank.

California Red-Legged Frog

Threats to California red-legged frogs in the action area include habitat loss and degradation from human activities, including development, off-road vehicle use and various forms of recreation, inappropriate levels of grazing, agriculture, flood control maintenance, herbicide and pesticide use, and by non-human activities such as predation by introduced species and/or feral animals (Service 2002, 2010).

There are 128 occurrences within or immediately adjacent to the Conservation Strategy Study Area (CDFG 2011). These occurrences are distributed throughout all of the Conservation Zones. The Conservation Strategy has mapped potential breeding and upland habitat throughout the Conservation Strategy Study Area. Based on these occurrences, presence of suitable habitat, and the biology and ecology of the species, the Service has determined it is reasonable to conclude the California red-legged frog inhabits the action area.

The Conservation Strategy Study Area is located within the East San Francisco Bay Core Area of the South and East San Francisco Bay Recovery Unit. The recovery plan established the following conservation needs for the East San Francisco Bay Core Area: (1) protect existing populations; (2) control non-native predators; (3) study effects of grazing on riparian corridors, ponds, and uplands (e.g., on EBRPD lands); (4) reduce impacts associated with livestock grazing; (5) protect habitat connectivity; (6) minimize effects of recreation and off-road vehicle use (e.g., Corral Hollow watershed); (7) avoid and reduce impacts of urbanization; and (8) protect habitat buffers from nearby urbanization (Service 2002).

Numerous recent developments have reduced habitat and known California red-legged frog populations: Schaefer Ranch in west Dublin; Dublin Ranch and other developments along Tassajara Road; Positano and Jordan Ranch developments within the East Dublin Specific Plan; and Las Positas College build out, business parks and vineyards in North Livermore.

California Red-Legged Frog Critical Habitat

The Conservation Strategy Study Area is within California red-legged frog critical habitat units CCS-2B, ALA-1A, ALA-1B, and ALA-2 for a total of 148,105 acres. Approximately 21,981 acres are protected and 126,033 acres are unprotected.
California red-legged frog critical habitat unit CCS-2B, a subunit of the CCS-2, Mount Diablo Unit, occurs in Conservation Zones 2, 3, 4, 5, 6, and 7. Approximately 81 acres occur in Conservation Zone 2, 7,426 acres occur in Conservation Zone 3, 857 acres occur in Conservation Zone 4, 8,343 acres occur in Conservation Zone 5, 13,095 acres occur in Conservation Zone 6, and 842 acres occur in Zone 7. Of those, approximately all the critical habitat lands in Conservation Zones 2 and 3, 774 acres in Conservation Zone 4, 6,637 acres in Conservation Zone 5, 12,489 acres in Conservation Zone 6, and 701 acres in Conservation Zone 7 are unprotected. Unit CCS-2 totals approximately 48,697 acres of land, and is located in eastern Contra Costa County and northeastern Alameda County, north of Highway 580. Subunit CCS-2B contains (44,470 acres) the features that are essential for the conservation of the species. The subunit contains aquatic habitat for breeding and non-breeding activities (PCE 1 and PCE 2), and upland habitat for foraging and dispersal activities (PCE 3 and PCE 4). Subunit CCS-2B was known to be occupied at the time of listing and is currently occupied. The subunit contains permanent and ephemeral aquatic habitats suitable for breeding, and upland areas for dispersal, shelter, and food, and provides for connectivity between populations farther south in the interior Coast Range. Subunit CCS-2B contains some of the highest concentrations of California red-legged frogs and habitat and could serve as a source for potential reintroduction efforts. Subunit CCS-2B consists of 4,059 acres of State, 3,088 acres of local government, and 37,322 acres of private lands and was mapped from occurrences recorded at the time of listing and subsequent to the time of listing. The physical and biological features essential to the conservation of California red-legged frog in Unit CCS-2 may require special management considerations or protection due to predation by nonnative species, urbanization, overgrazing of aquatic and riparian habitats, and erosion and siltation due to flooding, which may alter aquatic and upland habitats and thereby result in the direct or indirect loss of egg masses or adults.

Approximately 814 acres of California red-legged frog critical habitat subunit ALA-1A, Dublin Canyon, occurs within Conservation Zone 1. Of those, 543 acres are unprotected. This subunit is comprised of approximately 3,650 acres of land and is located in northwestern Alameda County and southern Contra Costa County, north of Highway 580 and west of Dublin, California. Subunit ALA-1A contains the features that are essential for the conservation of the species. The subunit contains aquatic habitat for breeding and non-breeding activities (PCE 1 and PCE 2), and upland habitat for foraging and dispersal activities (PCE 3 and PCE 4). ALA-1A was known to be occupied at the time of listing and is currently occupied. The subunit contains permanent and ephemeral aquatic habitats that provide for breeding that are comprised of manmade stock ponds and natural streams with emergent vegetation, willows, or are surrounded by riparian vegetation, grasslands and oak forest. These aquatic habitats also have adjacent upland areas for dispersal, shelter, and foraging opportunities. Subunits ALA-1A and ALA-1B provide for connectivity between populations farther south in the East San Francisco Bay foothills and represents the southernmost distribution of the California red-legged frogs and its habitat in the East San Francisco Bay region. The subunit consists of 603 acres of local

government land and 3,047 acres of private land and is mapped from occurrences recorded at the time of listing and subsequent to the time of listing. The physical and biological features essential to the conservation of California red-legged frog in the ALA- 1A subunit may require special management considerations or protection due to removal and alteration of habitat due to urbanization, alteration of aquatic and riparian habitats, dumping, and erosion and siltation of ponded habitat, which may alter aquatic or upland habitats and thereby result in the direct or indirect loss of egg masses or adults.

Approximately 1,829 acres of California red-legged frog critical habitat subunit ALA-1B, Cook Canyon, occurs within Conservation Zone 8. Of those, 834 acres are unprotected. This subunit is comprised of approximately 10,159 acres of land and is located in northwestern Alameda County, south of Highway 580. Subunit ALA-1B contains the features that are essential for the conservation of the species. The subunit contains aquatic habitat for breeding and non-breeding activities (PCE 1 and PCE 2), and upland habitat for foraging and dispersal activities (PCE 3 and PCE 4). ALA-1B was known to be occupied at the time of listing and is currently occupied. The subunit contains permanent and ephemeral aquatic habitats comprised of manmade stock ponds and natural streams with emergent vegetation, willows surrounded by riparian vegetation, grasslands and oak forest that provide for breeding, and upland areas for dispersal, shelter, and foraging opportunities. Subunits ALA-1A and ALA-1B provide for connectivity between populations farther north in the East San Francisco Bay foothills and also represents the southernmost distribution of the California red-legged frog and its habitat in the East San Francisco Bay region. ALA-1B consists of 3,667 acres of local government land and 6,792 acres of private land and is mapped from occurrences recorded at the time of listing and subsequent to the time of listing. The physical and biological features essential to the conservation of California red-legged frog in the ALA-1B subunit may require special management considerations or protection due to removal and alteration of habitat due to urbanization, alteration of aquatic and riparian habitats, and erosion and siltation of ponded habitat, which may result in direct or indirect loss of egg masses or adults.

California red-legged frog critical habitat unit ALA-2, Arroyo Valle, occurs in Conservation Zones 9, 10, 11, 12, 13, 15, 16, 17, and 18. Approximately 11,966 acres occur in Conservation Zone 9, 24,937 acres occur in Conservation Zone 10, 92 acres occur in Conservation Zone 11, 8,567 acres occur in Conservation Zone 12, 11,670 acres occur in Conservation Zone 13, 6,631 acres occur in Conservation Zone 15, 23,265 acres occur in Conservation Zone 16, 8,838 acres occur in Conservation Zone 17, and 18,763 acres occur in Conservation Zone 18. Of those, all of the critical habitat lands in Conservation Zones 9, 11, and 13, 24,659 acres in Conservation Zone 10, 8,427 acres in Conservation Zone 12, 1,535 acres in Conservation Zone 15, 14,958 acres in Conservation Zone 16, 4,878 acres in Conservation Zone 17, and 18,363 acres in Conservation Zone 18 are unprotected. This unit is comprised of approximately 153,624 acres of land and is located in southwestern Alameda County, south of Highway 580 at Altamont Pass southeast into San Joaquin County and southwest into Santa Clara County near Arroyo Hondo and Calaveras Reservoir. Unit ALA-2 contains the features that are essential for the conservation of the species. The unit contains aquatic habitat for breeding and non-breeding activities (PCE 1 and PCE 2), and upland habitat for foraging and dispersal activities (PCE 3 and PCE 4). ALA-2 was known to be occupied at the time of listing and is currently occupied. The unit contains

permanent and ephemeral aquatic habitats comprised of natural ponds and streams and manmade stock ponds with emergent vegetation, willows surrounded by riparian vegetation, grasslands and oak forest that provide for breeding, and upland areas for dispersal, shelter, and foraging opportunities. The unit provides for connectivity between populations farther north and south in the interior Coast Range. The unit consists of 6,892 acres of Federal, 3,932 acres of State, 39,525 acres of local government, and 103,276 acres of private lands and is mapped from occurrences recorded at the time of listing and subsequent to the time of listing. The physical and biological features essential to the conservation of California red-legged frog in the ALA-2 unit may require special management considerations or protection due to urbanization, alteration of aquatic and riparian habitats, and erosion and siltation of ponded habitat, which may alter aquatic or upland habitats and thereby result in the direct or indirect loss of egg masses or adults.

Central California Tiger Salamander

Threats to Central California tiger salamanders in the action area include habitat destruction, degradation, and fragmentation due to urban development and conversion to intensive agriculture, off-road vehicle use and various forms of recreation inappropriate levels of grazing, exposure to various contaminants, rodent population control efforts, mosquito control, hybridization with nonnative tiger salamanders and predation by introduced species and/or feral animals (Service 2004b).

There are 150 occurrences within or immediately adjacent to the Conservation Strategy Study Area (CDFG 2011). These occurrences are distributed throughout most of the Conservation Zones. The Conservation Strategy has mapped potential breeding and upland habitat throughout the Conservation Strategy Study Area. Based on these occurrences, presence of suitable habitat, and the biology and ecology of the species, the Service has determined it is reasonable to conclude the Central California tiger salamander inhabits the action area.

Numerous recent developments have reduced habitat and known Central California tiger salamander populations: Dublin Ranch and other developments along Tassajara Road; Positano and Jordan Ranch developments within the East Dublin Specific Plan; and Las Positas College build out, business parks and vineyards in North Livermore.

Central California Tiger Salamander Critical Habitat

The entire Central California tiger salamander critical habitat unit 18, Doolan Canyon Unit, is located within Conservation Zone 3. This unit contains approximately 1,178 unprotected acres and is essential to the conservation of the species because it is needed to maintain the current geographic and ecological distribution of the species in the Central Valley Geographic Region. At the time of designation, two extant occurrences of the species were found in this unit. Unit 18 is south of the Contra Costa County line near Collier Canyon Road on the east and the south, and the City of Dublin on the west. Land ownership is private. Threats that require special management considerations for this unit include urban developments, agricultural land conversions, and associated infrastructure, including road construction which could destroy or degrade aquatic habitat essential for breeding and rearing; destroy, degrade, or fragment upland

habitat essential for growth, feeding, resting, and aestivation; or destroy, degrade, or fragment habitat essential for dispersal and connectivity. Portions of Unit 18 are being proposed to be added to the City of Dublin's Sphere of Influence for development. At the same time, the City of Livermore is proposing to add the same lands to their Sphere of Influence for open space protection.

Alameda Whipsnake

Threats to Alameda whipsnakes in the action area include urban development and habitat loss and fragmentation, water development projects, predation, colonization of non-native plants species, inappropriate grazing, and off-road vehicle use and various forms of recreation (Service 2011).

There are 19 occurrences within the Conservation Strategy Study Area (CDFG 2011). These occurrences are listed as sensitive in the CNDDB and the specific locations will not be discussed in this Programmatic BO. The Conservation Strategy was not able to model parameters for Alameda whipsnake habitat. Instead, the Conservation Strategy used the draft recovery units and designated critical habitat for mapping potential habitat in Conservation Zones 1, 2, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18. Based on these occurrences, presence of suitable habitat, and the biology and ecology of the species, the Service has determined it is reasonable to conclude the Alameda whipsnake inhabits the action area.

The Conservation Strategy Study Area contains portions of draft Recovery Unit 2 (Oakland-Las Trampas) in Conservation Zone 1, portions of draft Recovery Unit 3 (Hayward-Pleasanton Ridge) in Conservation Zone 8, portions of draft Recovery Unit 4 (Mount Diablo-Black Hills) in Conservation Zones 4 and 5, all of draft Recovery Unit 7 (Niles Canyon-Sunol Corridor) in Conservation Zones 14 and 15, and 75 percent of draft Recovery Unit 5 (Sunol-Cedar Mountain) in Conservation Zones 2, 9, 10, 11, 12, 13, 15, 16, 17, and 18. A little over one-third of draft Recovery Unit 2 and almost the entirety of the western border of this unit are in public ownership. However, significant development pressure continues from the north, southwest, and east (Service 2011). Approximately one third of draft Recovery Unit 3 is owned by EBRPD. However, very few of these EBRPD-owned parcels are contiguous or located adjacent to urban development; therefore; they provide little protection from the development pressures associated with adjacent urban areas and transportation corridors (Service 2011). Draft Recovery Unit 7 was designated to provide habitat linkage between draft Recovery Units 3 and 5, across Interstate 680. More than three quarters of this unit is in public ownership; SFPUC is the largest landowner and EBRPD owns several parcels in the western portion of the unit (Service 2011). Draft Recovery Unit 4 contains one of the most isolated populations of Alameda whipsnakes and more than two-thirds is within the East Contra Costa Habitat Conservation Plan (Service 2011). Approximately one quarter of draft Recovery Unit 5 is within public ownership; SFPUC, EBRPD, City of Fremont, Santa Clara County, and California Department of Park and Recreation are the largest public land owners within the unit. Current development pressure within and adjacent to this unit is primarily associated with the Cities of Pleasanton and Livermore along the northwestern border and the Cities of Fremont and Milpitas along the western border.

Alameda Whipsnake Critical Habitat

The Conservation Strategy Study Area is within Alameda whipsnake critical habitat units AWS-3, AWS-5A, and AWS-5B for a total of 53,260 acres. Approximately 13,722 acres are protected and 39,538 acres are unprotected.

Approximately 14,916 acres of Alameda whipsnake critical habitat unit AWS-3, Hayward-Pleasanton Ridge, occur in Conservation Zone 8 and 12 occur in Conservation Zone 14. Of those, approximately all the critical habitat lands in Conservation Zone 14 and 10,134 acres are unprotected. Unit 3 is located immediately to the west of Interstate 680 and to the south of Interstate 580 and totals 25,966 acres. Land ownership includes 404 acres of EBRPD land and 25,562 acres of privately owned land. Unit 3 contains the mosaic of scrub and chaparral vegetation and rocky outcrops (PCE 1, PCE 3) considered essential to the conservation of the subspecies. The unit also includes variation in vegetation patch size, abundant edge between grassland and woodland, and a minimal amount of development or planned development. The area supports scrub and rock outcrop features essential for Alameda whipsnake. The Alameda whipsnake records within this unit are associated with Gaviota rocky sandy loams in particular, which likely provide talus (PCE 3), and appear to coincide in aerial imagery to scrub or chaparral vegetation preferred byAlameda whipsnake. Vegetation is largely of oak woodland community of variable densities (PCE 2) and statures (trees, shrubs) interspersed with grassland. Some peripheral portions of habitat around this unit were not included as critical habitat due to the high degree of development-related disturbance and fragmentation of the habitat. The unit is included in the designated critical habitat because it contains features essential to the conservation of the Alameda whipsnake; is currently occupied by the subspecies; and represents the southwestern portion of the subspecies' range and one of the five population centers. The special management actions that may be required throughout this unit include management of controlled burns and grazing, trespass, unauthorized trail and road construction, dumping, and/or feral animals, and other activities or situations associated with the urban or recreational interface.

Alameda whipsnake critical habitat unit AWS-5A, Cedar Mountain, occurs in Conservation Zones 9, 10, 12, 13, and 18. Approximately 185 acres occur in Conservation Zone 9, 11,046 acres occur in Conservation Zone 10, 2,191 acres occur in Conservation Zone 12, 8,913 acres occur in Conservation Zone 13, and 366 acres occur in Zone 18. Of those, approximately all the critical habitat lands in Conservation Zones 10, 12, 13 and 18, and 184 acres in Conservation Zone 9 are unprotected. Unit 5A is located east of Lake Del Valle along Cedar Mountain Ridge and Crane Ridge to Corral Hollow west of Interstate 580 and totals 24,723 acres. Land ownership within this unit includes approximately 2,492 acres of Department of Energy land, 246 acres of EBRPD land, and 21,986 acres are privately owned. The vegetation pattern within this unit consists of various woodland, scrub, and/or chaparral communities on northeast-facing slopes (PCE 1, PCE 2). Rock bearing soils which are associated with multiple Alameda whipsnake records (e.g. Vallecitos rocky loam) as well as rock lands are abundant, indicating the presence of PCE 3. Open, grassland-dominated communities are prominent on southwest-facing slopes, but there is also a significant component of woodland habitat on these slopes. Significant areas of vegetation types known to support Alameda whipsnake are present, including coastal oak, chamise-chaparral, mixed chaparral, blue-oak-foothill pine woodland, blue oak woodland,

valley oak woodland, and montane hardwood. In most instances, the boundaries for critical habitat designation correspond to natural breaks in plant communities, habitat quality, and/or landform (ridgelines, water features). A moderate number of light duty roads (e.g., paved or unpaved lightly used) are present within the unit, although there are very few structures or other land modifications. Special management, such as prescribed burns, may be required for portions of the unit with dense vegetation. The special management actions that may be required throughout this unit include management of grazing, trespass, unauthorized trail and road construction, dumping, and/or feral animals, and other activities or situations associated with urban or recreational interface. The unit is included in designated critical habitat because it contains features essential to the conservation of the Alameda whipsnake, is currently occupied by the subspecies, and represents the southernmost and easternmost distribution of Alameda whipsnake and one of five population centers for the subspecies.

Alameda whipsnake critical habitat unit AWS-5B, Alameda Creek, occurs in Conservation Zones 15, 16, and 17. Approximately 6,457 acres occur in Conservation Zone 15, 35 acres occur in Conservation Zone 16, and 9,141 acres occur in Conservation Zone 17. Of those, approximately 1,388 acres of the critical habitat lands in Conservation Zones 15, 18 in Conservation Zone 16, and 5,286 acres in Conservation Zone 17 are unprotected. This unit is located northeast of Calaveras Reservoir, south of the town of Sunol, including the area along Wauhab Ridge in Alameda County and Oak Ridge in Santa Clara County and totals 18,214 acres. Land ownership within this unit includes approximately 361 acres of EBRPD lands and 17,854 acres in private lands. Vegetation is a mix of blue oak--foothill pine and annual grassland with a significant amount of woodland patches. Coastal live oak is present in the vicinity of Lleyden Creek. Soil types in which Alameda whipsnakes are found dominate the unit. This unit contains six Alameda whipsnake records documented between 1972 and 2000 (Swaim 2005a). Significant areas of vegetation types known to support Alameda whipsnake are present, including coastal oak, chamise-chaparral, mixed chaparral, blue oak-foothill pine woodland, blue oak woodland, valley oak woodland, and montane hardwood interspersed with rock outcrops or talus (PCEs 1, 2, 3). The boundaries for critical habitat designation correspond to natural breaks in plant communities, soil type, and or landform. A moderate number of light roads are present within the unit, although there are very few structures or other land modifications. Development within or adjacent to the unit is minimal. As a result of this low development pressure, the survey efforts for the Alameda whipsnake in this unit have not been as extensive as in the other units. Special management, such as prescribed burns, may be required for portions of the unit with dense vegetation. Other special management actions which may be required throughout this unit includes management of grazing, unauthorized trail and road construction, dumping, and/or feral animals, control and other activities or situations associated with urban or recreational interface. The unit is included in designated critical habitat because it contains features essential to the conservation of the Alameda whipsnake, is currently occupied, and represents the southernmost distribution of Alameda whipsnake and one of the five population centers for the subspecies.

San Joaquin Kit Fox

Threats to San Joaquin kit foxes in the action area include loss and modification of habitat due to agricultural conversion, infrastructure construction, and urban development, pesticides and

rodenticides, road mortality and off-road vehicle use, competition, and predation (Service 1998, 2010b).

There are 17 occurrences within the Conservation Strategy Study Area (CDFG 2011). These occurrences are distributed in the northeastern Conservation Zones with an outlier in Conservation Zone 14. Alameda and Contra Costa counties are the northern extent of the San Joaquin kit fox range. The Conservation Strategy has mapped suitable habitat throughout the Conservation Strategy Study Area. Based on these occurrences, presence of suitable habitat, and the biology and ecology of the species, the Service has determined it is reasonable to conclude the San Joaquin kit fox inhabits the action area.

Portions of the Conservation Strategy Study Area are located within the San Joaquin kit fox recovery satellite population S1. In addition to protection of core areas, protection of at least three satellite populations is required for downlisting and protection of additional satellite populations with three or more showing stable or increasing populations during one precipitation cycle is required for delisting. According to the recent 5-year review (Service 2010b) the trend for the S1 population has declined with no known breeding. The recovery plan (Service 1998) lists protecting habitat in the northern, northeastern, and northwestern segments of the range and existing connections between habitat in those areas and habitat south as a recovery action.

Numerous developments and activities have reduced and/or fragmented habitat for the San Joaquin kit fox in the Conservation Strategy Study Area: Dublin Ranch and other developments along Tassajara Road; Positano and Jordan Ranch developments within the East Dublin Specific Plan; and Las Positas College build out, business parks and vineyards in North Livermore, commercial and private racetracks and off-road vehicle parks, energy and water infrastructure projects, and agricultural conversion.

Palmate-Bracted Bird's-Beak

Threats to palmate-bracted bird's-beak include habitat loss in the form of habitat alteration and degradation as a result of changes to natural hydrology and salinity, invasive species, incompatible grazing regimes, off-road vehicle use, and development (Service 1998, 2009b).

There is one occurrence within the Conservation Strategy Study Area in Springtown Alkali Sink Preserve in the City of Livermore (CDFG 2011). The population varies in size from year to year. Portions of the Springtown Alkali Sink Preserve are protected; however local residents use the area for off-road bicycling, dog walking, and various other activities in both the protected and unprotected areas. The Conservation Strategy did not model habitat due to the limited occurrence and habitat and the vast amount documentation of that one occurrence. Based on the documentation of the occurrence over the years, presence of suitable habitat, and the biology and ecology of the species, the Service has determined it is reasonable to conclude the palmate-bracted bird's-beak inhabits the action area.

Effects of the Proposed Action

The following effects analysis is based on the effects of Covered Activities on federally listed species. Project(s) appended to this Programmatic BO must adhere to the minimization measures described in the Description of the Action. Implementation of the minimization measures may have some adverse effects but will likely have greater beneficial effects as a result of creation, restoration and enhancement of habitat for these species. Because many of the effects resulting from the Covered Activities may apply to more than one species and the specific projects under the Covered Activities have not been described, the effects are described below are discussed generally. Project specific effects to listed species and their critical habitats will be described individually when appended to this Programmatic BO.

Habitat Loss, Fragmentation, and Degradation

Habitat alteration consists of changes made to the environment that adversely affect ecosystem function, although not perhaps completely or permanently (Dodd and Smith 2003). Habitat alteration includes the physical conversion of natural habitat to unnatural habitat (loss), the breaking of large, contiguous blocks of habitat into smaller patches (fragmentation), the increasing separation of blocks of habitat from one another (isolation), and the changes in a habitat that effects its composition, structure, or function (degradation) (Noss *et al.* 1997). Habitat alteration includes physical, chemical, and biotic changes. Projects listed in the Description of the Action of this Programmatic BO will result in habitat alteration; however, implementation of the measures described in the Conservation Strategy and this Programmatic BO will minimize the adverse effects of habitat alteration. These conservation measures include mitigation/compensation, BMPs, and species specific minimization measures.

Habitat loss is one of the main threats to listed species. Habitat loss is defined as the complete elimination of a localized or regional ecosystem leading to the total loss of its former biological function (Dodd and Smith 2003). A direct effect of habitat destruction/reduction is the decline and/or loss of individuals or populations from the portion of the landscape that has been destroyed. Species that previously used the site become displaced. Population numbers of native and listed species that are limited in range and suitable habitat are reduced even further.

Habitat fragmentation is an effect of habitat loss and occurs when remaining populations are isolated because the links between habitat patches have been destroyed. Habitat fragmentation can be an important factor contributing to species declines because: (1) it divides a large population into two or more small populations that become more vulnerable to direct loss, inbreeding depression, genetic drift, and other problems associated with small populations; (2) it limits a species' potential for dispersal and colonization; and (3) it makes habitat more vulnerable to outside influences by increasing the edge to interior ratio (Primack 1998). Small, isolated subpopulations are susceptible to extirpation from random demographic, environmental, and/or genetic events (Shaffer 1981; Lande 1988; Primack 1998). While a large area may support a single large population, the smaller subpopulations that result from habitat fragmentation may not be large enough to persist over a long time period. As a population becomes smaller, it tends to lose genetic variability through genetic drift, leading to inbreeding

depression and a lack of adaptive flexibility. Smaller populations also become more vulnerable to random fluctuations in reproductive and mortality rates, and are more likely to be extirpated by random environmental factors. When a sub-population becomes extirpated, habitat fragmentation reduces the chance of recolonization from any remaining populations.

Deleterious effects of habitat fragmentation and conversion of natural habitats to other uses often extend beyond project footprints resulting in "edge effects." The biological integrity of habitats adjoining development can be diminished by adverse effects of noise, lighting, irrigation, exotic plant and animal introduction, predators, parasitism, disturbance from human activities, changes in fire regimes, and other factors. The severity of these effects depends on distance to land alteration boundaries, source of disturbance, and the affected species. Species that are particularly vulnerable to edge effects require large patches of habitat that are relatively free from edge effects.

Movement and dispersal corridors are important for alleviating over-crowding and intraspecific competition, and also they are important for facilitating the recolonization of areas where the animal has been extirpated. Movement between population centers maintains gene flow and reduced genetic isolation. Genetically isolated populations are at greater risk of deleterious genetic effects such as inbreeding, genetic drift, and founder effects. The survival of wildlife species in fragmented habitats may ultimately depend on their ability to move among patches to access necessary resources, retain genetic diversity, and maintain reproductive capacity within populations (Hilty and Merenlender 2004; Petit *et al.* 1995; Buza *et al.* 2000).

Effects of habitat fragmentation can be minimized by maintaining linkages (Soule 1986; Saunders *et al.* 1991; Beirer and Noss 1999). Linkages are connections between larger blocks of habitat that allow for wildlife movement, recruitment, and colonization between different core biological areas. Linkages are important for allowing species to move or disperse from their natal areas to sites where they may reproduce. Linkages that provide for successful movement between core population areas reduce genetic isolation and allow for recruitment into areas where populations have been extirpated due to natural or anthropogenic disturbances or stochastic events (Soule and Simberloff 1986; Lande 1988). Several factors influence the effectiveness of habitat linkages including length, width, and species targeted for use (Meffe and Carrol 1998). When large blocks of habitat remain intact, the rate of successful dispersal between core population areas is higher. At a minimum, dispersal habitat within linkages should provide some level of foraging and limited protection from predators. When the distance between core populations of a species is greater than the dispersal distance for individuals, effective linkages must provide live-in habitat. It is important to recognize that the effectiveness of any habitat linkage varies considerably by species. Linkages are critical to the design and function of any conservation area.

The Conservation Strategy was designed to incorporate the large scale goal and objectives of natural communities down to the species specific goals and objectives. The multi-scale approach was developed to incorporate diversity, linkages, natural communities, and species specific conservation goals and objectives. This approach stepped down to conservation priorities that protect key features identified for each Conservation Zone and will minimize the effects from

project related habitat loss and fragmentation.

Additionally, the preservation and restoration of habitat will minimize the effects of habitat lost as a result of projects appended to this Programmatic BO. Compensation for effects to occupied and suitable habitat will be in the form of preserving occupied sites or established sites with the same affected species. The location of the compensation may be anywhere appropriate within the Conservation Strategy Study Area as depicted in Appendix C and as described in the Conservation Strategy. Conservation easements, adaptive management plans and endowment funding will increase the probability of populations to be viable in the long term and will be protected in perpetuity.

The Conservation Strategy addresses project-level mitigation for potential impacts to species and habitats throughout the eastern part of the county and provides a coordinated approach for local conservation efforts beyond those required by regulatory requirements. The combination of project-level mitigation and voluntary conservation will help to ensure that the effects from habitat loss and fragmentation are minimized in the Conservation Strategy Study Area.

Construction

Construction work within the specific project footprint, access areas, and staging areas can result in direct mortality or injury to individuals, harassment of the animals, and entrapment. Mortality or injury to species can occur from being crushed by earth moving equipment and worker foot traffic. Individuals in burrows may be killed or injured by filling or grading activities. Work activities, including vibration, dust, noise, contaminants, and lighting may cause individuals to leave the work site and surrounding areas. This disturbance and displacement may increase the potential for predation, desiccation, competition for food and shelter, or strike by vehicles on roadways. Implementation of the minimization measures like preconstruction surveys, exclusion fencing, etc., as described in the Conservation Strategy and this Programmatic BO will minimize these effects to listed species.

Preconstruction surveys and the relocation of individuals may reduce injury or mortality. However, the capturing and handling of these species to remove them from a work area if they become trapped may result in the mortality or injury of individuals. These effects would be reduced or prevented by the use of a Service-approved biologist.

Minimization Measures and Conservation Activities

The Conservation Strategy's standardized avoidance, minimization, mitigation, and compensation requirements will result in consistent and effective protection of listed species in the Conservation Strategy Study Area.

The standardized mitigation ratios as described in Appendix C ensure the protection of occupied habitat at a greater rate than what is lost. The ratios with the correction factor are intended to protect high quality, occupied habitat within close proximity to the project site and if applicable, within the same critical habitat unit. Standard mitigation/compensation using the guidance

provided in Chapter 5 of the Conservation Strategy combined with the required conservation easement, management plan, and endowment to implement the management plan will minimize the effects of habitat loss and fragmentation to listed species. Mitigation/compensation also includes purchase of appropriate credits from approved mitigation banks.

Enhancement and restoration projects may adversely affect individuals or temporarily affect habitat as described in the Construction section above. However, the long term benefits of restoration and conservation will provide listed species protected and managed habitat in perpetuity. Conservation will improve protection for listed species and their habitats, improve habitat quality, increase species population size, increase extent of protected habitat, and increase connectivity for species between occupied areas.

General Effects to Longhorn Fairy Shrimp, Vernal Pool Fairy Shrimp, and their Critical Habitats

Ground-disturbing Covered Activities have the potential to result in direct mortality, life cycle disturbance, and reduce habitat quality for the longhorn fairy shrimp and vernal pool fairy shrimp. Shrimp cysts could be buried by soil moved into vernal pools, swales, or other habitat during ground-disturbing activities. In addition, upland habitat and swales around a vernal pool and within a vernal pool complex are essential to the hydrological biological integrity of the vernal pool and complex. Vernal pool habitat indirectly affected would include all habitat supported by upland areas and all habitat otherwise damaged by effects to the watershed, introduced species, human intrusion, or pollution caused by a project. Where the reach of these indirect effects cannot be determined definitively, the Service considers all areas within 250 feet of a vernal pool to be indirectly affected. If any habitat within a vernal pool complex is impacted, then all remaining habitat within the complex is considered indirectly affected. Examples of potential indirect effects from Covered Activities include possible disruption of hydrological integrity within a vernal pool, sandstone outcropping, or other suitable habitat within the associated upland habitat, or within the vernal pool complex. Other potential indirect effects to vernal pool habitat could result from dust generated during covered activities and subsequently deposited within vernal pools adjacent to work sites. Water and habitat quality could be reduced by a variety of indirect effects associated with Covered Activities. Covered Activities have the potential to spread invasive weeds that could reduce habitat quality within vernal pools or their associated uplands. Implementation of the Conservation Strategy and the additional minimization measures described in the Programmatic BO will reduce the potential for these effects and contribute to recovery goals for the species.

Approximately 267 acres of longhorn fairy shrimp critical habitat Unit 1B in the Conservation Strategy Study Area are unprotected. Approximately 952 acres of vernal pool fairy shrimp critical habitat Unit 19C are unprotected. The Service and Corps cannot predict where projects will be constructed, and some may be constructed inside designated longhorn fairy shrimp and vernal pool fairy shrimp critical habitat. Projects appended to this Programmatic BO will discuss effects, species effects, effects on PCEs and how that will influence the recovery role of affected critical habitat units, appropriate avoidance and minimization measures as described in this document and the Conservation Strategy, and ways to ensure that the recovery role of critical habitat units is maintained. Compensation will be a combination of preservation and

restoration/creation of habitat. The requirements (conservation easement, endowment, and management plan) and minimum ratio for compensation/mitigation for effects to individuals and habitat for both species will ensure preservation of habitat that provides overall improved management and enhancement of the sites.

General Effects to Callippe Silverspot Butterfly

Ground disturbing activities could affect grasslands that support the larval host plant for callippe silverspot butterfly, cause the loss of individuals, and remove nectar plants (e.g. California buckeye, thistle species) used by adults. Dust generated from construction activities could degrade the quality of habitat by smothering larval host plants. Due to the short life span of adults, which emerge and breed within a period of only a few weeks, there is no predictable period during the year when the host plants would not support either larvae at some stage of development, or newly deposited eggs. Therefore, direct mortality of callippe silverspot butterfly eggs or larvae could occur if the plants were affected.

Ground disturbance also could reduce the number of stable holes and cracks that larvae use during diapause, which would result in increased risk of predation. Larvae could be crushed by foot or vehicle traffic, or grazing livestock. Soil could inadvertently fill cracks in the soil where larvae occur. Spills of hazardous materials such as paint or engine fuel could contaminate habitat and make it unsuitable or could poison butterflies in the area. Prescribed burns could result in injury or mortality of larvae, and damage to host plants (Mollenbeck *et al.* 2009), although long-term effects of prescribed burns are expected to result in a net benefit through elimination of invasive plants that outcompete the larval food plant. Grazing could potentially affect the species through trampling of larvae and herbivory of food plants. However, most of the grasslands mapped as suitable habitat are currently grazed. Beneficial or adverse effects of grazing will be determined on a project by project basis.

Measures to avoid and minimize effects to the species would involve preconstruction surveys for host plants and avoiding disturbance in areas that support host plants when feasible. Implementation of the Conservation Strategy and the additional minimization measures described in the Programmatic BO will reduce, but not eliminate, the potential for these effects. Conservation measures to minimize vegetation removal and direct injury, destruction, or removal of larvae, eggs, and host plants would include preconstruction surveys; installing exclusion fencing; providing worker awareness training; monitoring; limiting work areas; and confining activities to designated work areas. The risk of effects from spills of hazardous materials will be avoided through limiting maintenance activities to designated areas and implementation of toxic-spill prevention measures. The minimum ratio for compensation/mitigation for effects to individuals and habitat will ensure preservation of habitat and critical habitat consistent with the goals and objectives of the Conservation Strategy and the criteria to recover the species.

General Effects to California to Red-Legged Frog and its Critical Habitat

California red-legged frogs require both terrestrial and aquatic environments and migrate between the two habitat types, therefore, they can be particularly sensitive to the effects of

urbanization or other growth-related changes that permanently alter or expose either of these environments. New roads and urbanization can create barriers between aquatic and terrestrial habitat. Indirect effects that affect streams or ponds, including increased runoff of urban pollutants, spread of nonnative plants, and spread of nonnative predators, can adversely affect California red-legged frogs. Amphibians can be affected by sedimentation, changes in water quantity and temperature, and road runoff. Sedimentation increases turbidity thereby reducing the amount of light in the water column and primary nutrient production. Significant sedimentation may also change streambed characteristics. Changes in hydrology can favor nonnative predatory species. Human activities or impacts that increase as the human population grows can also indirectly affect California red-legged frogs. These effects include light pollution, human disturbance, increase of urban-adapted predators (skunks and raccoon), increased numbers of domestic predators (dogs and cats), introduction of other nonnative predators (e.g., bullfrogs), increased vehicle-related disturbance, and increased risk of wildfire. Implementation of the Conservation Strategy and the additional minimization measures described in the Programmatic BO will reduce, but not eliminate, the potential for these effects.

Approximately 543 acres of California red-legged frog critical habitat subunit ALA-1A, 834 acres of subunit ALA-1B and 96,548 acres of unit ALA-2, and 28,108 in unit CCS-2 in the Conservation Strategy Study Area are unprotected. The Service and Corps cannot predict where projects will be constructed, and some may be constructed inside designated critical habitat. Projects appended to this Programmatic BO will discuss species effects, effects on PCEs and how that will influence the recovery role of affected critical habitat units, appropriate avoidance and minimization measures as described in this document and the Conservation Strategy, and ways to ensure that the recovery role of critical habitat units is maintained.

Implementation of the Conservation Strategy and additional minimization measures will protect and manage occupied habitat in perpetuity and contribute to recovery goals for the species. California red-legged frog compensation areas will contain both suitable aquatic and terrestrial habitat. Compensation areas or restored habitat will have measures in place to minimize or eliminate populations of exotic aquatic predators such as bullfrogs. Compensation areas will be located within habitat currently occupied by California red-legged frogs. The minimum ratio for compensation/mitigation for effects the species and loss of habitat is 2.5:1 and may increase to 3.5:1 or higher depending on the location of the project and compensation sites, project effects, and quality of habitat at both sites. The requirements (conservation easement, endowment, and management plan) and minimum ratio for compensation/mitigation for effects to individuals and habitat will ensure preservation of habitat that provides overall improved management and enhancement of the sites. These measures will assist in conserving blocks of contiguous habitat and linkages to other conserved areas for the species.

General Effects to Central California Tiger Salamander and its Critical Habitat

Central California tiger salamanders require both terrestrial and aquatic environments and migrate between the two habitat types, therefore, they can be particularly sensitive to the effects of urbanization or other growth-related changes that permanently alter or expose either of these environments. New roads and urbanization can create barriers between aquatic and terrestrial

habitat. Indirect effects that affect streams or ponds, including increased runoff of urban pollutants, and spread of nonnative predators, can adversely affect Central California tiger salamanders. Amphibians can be affected by sedimentation, changes in water quantity and temperature, and road runoff. Changes in hydrology to longer inundation periods can favor nonnative predatory species. Human activities or impacts that increase as the human population grows can also indirectly affect Central California tiger salamanders. These effects include light pollution, human disturbance, increase of urban-adapted predators (skunks and raccoon), increased numbers of domestic predators (dogs and cats), introduction of other nonnative predators (e.g., bullfrogs), increased vehicle-related disturbance, and increased risk of wildfire. Implementation of the Conservation Strategy and the additional minimization measures described in the Programmatic BO will reduce, but not eliminate, the potential for these effects.

All 1,178 acres of Central California tiger salamander critical habitat unit 18 in the Conservation Strategy Study Area are unprotected. The Service and Corps cannot predict where projects will be constructed, and some may be constructed inside designated critical habitat. Projects appended to this Programmatic BO will discuss species effects, effects on PCEs and how that will influence the recovery role of affected critical habitat units, appropriate avoidance and minimization measures as described in this document and the Conservation Strategy, and ways to ensure that the recovery role of critical habitat units is maintained.

Implementation of the Conservation Strategy and additional minimization measures will protect and manage occupied habitat in perpetuity. Central California tiger salamander compensation areas will contain both suitable aquatic and terrestrial habitat. Compensation areas and/or restored habitat will have measures in place to minimize or eliminate populations of exotic aquatic predators such as bullfrog. Compensation areas will be located within currently occupied habitat. The minimum ratio for compensation/mitigation for effects the species and loss of habitat is 2.5:1 and may increase to 4:1 or higher depending on the location of the project and compensation sites, project effects, and quality of habitat at both sites. The requirements (conservation easement, endowment, and management plan) and minimum ratio for compensation/mitigation for effects to individuals and habitat will ensure preservation of habitat that provides overall improved management and enhancement of the sites. These measures will assist in conserving blocks of contiguous habitat and linkages to other conserved areas for the species.

General Effects to Alameda Whipsnake and its Critical Habitat

Activities associated with projects appended to this Programmatic BO will result in the loss of suitable Alameda whipsnake habitat and the harm, harassment, injury, and death of individuals. There is increased potential for predation by non-native predators, fragmentation and isolation of suitable Alameda whipsnake habitat and migration corridors by development, lack of sufficient buffers between suitable habitat and adjacent development, and disturbance by increased human activity in the area. Alameda whipsnakes could be injured or killed by new roadways adjacent to suitable habitat, and by increased recreation (horseback riding, hiking, bicycling, and off-road vehicle use).

Approximately 10,146 acres of Alameda whipsnake critical habitat unit AWS-3, 22,700 acres of unit AWS-5A and 6,692 acres of unit AWS-5B in the Conservation Strategy Study Area are unprotected. The Service and Corps cannot predict where projects will be constructed, and some may be constructed inside designated critical habitat. Projects appended to this Programmatic BO will discuss species effects, effects on PCEs and how that will influence the recovery role of affected critical habitat units, appropriate avoidance and minimization measures as described in this document and the Conservation Strategy, and ways to ensure that the recovery role of critical habitat units is maintained.

Implementation of the Conservation Strategy and additional minimization measures will minimize adverse effects to individuals and protect and manage occupied habitat in perpetuity and contribute to recovery goals for the species. Compensation areas will be located within currently occupied habitat. Management plans for conservation areas will address grazing practices and vegetation management for the benefit of the Alameda whipsnake. The minimum ratio for compensation/mitigation for effects to species and loss of habitat is 2.5:1 and may increase to 4:1 or higher depending on the location of the project and the compensation, effects, and quality of habitat (see Appendix C and D of this Programmatic BO). The requirements (conservation easement, endowment, and management plan) and minimum ratio for compensation/mitigation for effects to individuals and habitat will ensure preservation of habitat that provides overall improved management and enhancement of the sites. These measures will assist in conserving blocks of contiguous habitat and linkages to other conserved areas for the species.

General Effects to San Joaquin Kit Fox

The Conservation Strategy Study Area represents an area of connectivity to the northernmost extension of the species' range in Contra Costa County. Maintaining this connectivity is critical for maintaining San Joaquin kit foxes in Alameda County. Development of movement corridors and expansion of development and energy projects in the Altamont Hills will substantially reduce the San Joaquin kit fox's ability to persist in the northern part of their range. The Conservation Strategy provides goals and objectives to maintain, enhance and protect suitable habitat and corridors.

Ground disturbing activities have the potential to adversely affect individual San Joaquin kit foxes. San Joaquin kit foxes in their dens could be crushed or harmed by equipment and vehicles driving over the occupied dens. Vehicles or equipment could strike San Joaquin kit foxes when they are out of their burrows. San Joaquin Kit foxes could be attracted to prey that is displaced from the ground disturbing activities sites, and thus be exposed to an elevated potential for injury, mortality, or predation. Individuals in dens adjacent to work-sites could be directly affected by noise and vibration from construction disturbance activities.

Compensation areas for San Joaquin kit fox will be located within the species' present range within the Conservation Strategy Study Area in areas that are generally considered occupied habitat. Compensation areas will be selected to contribute to maintenance of large habitat blocks and maintain connectivity of remaining San Joaquin kit fox habitat in the San Joaquin Valley,

consistent with the *Recovery Plan for Upland Species of the San Joaquin Valley* (USFWS 1998). Compensation areas will provide permanent habitat protection and management to compensate for disturbances to suitable habitat. The minimum ratio for compensation/mitigation for effects to the species and loss of habitat is 3:1 and may increase to 3.51 or higher depending on the location of the project and the compensation, project effects, and quality of habitat of both sites (see Appendix C and D of this Programmatic BO). The requirements (conservation easement, endowment, and management plan) and minimum ratio for compensation/mitigation for effects to individuals and habitat will ensure preservation of habitat that provides overall improved management and enhancement of the sites. These measures will assist in conserving blocks of contiguous habitat and linkages to other conserved areas for the species and contribute to recovery goals for the species.

General Effects to Palmate-Bracted Bird's-Beak

Soil excavations or other ground disturbances in or near occupied palmate-bracted bird's-beak habitat could affect this listed plant due to a permanent loss of soil structure, soil water-holding capacity, soil fertility, or loss of cryptogamic biological soil crusts and other microhabitat-features essential to this species. Soil excavations or other ground disturbances in occupied habitat are likely to fragment the occurrence, which could isolate individuals and affect genetic variability within that plant population. Occupied habitat might be permanently degraded if the disturbance site is invaded by non-native weedy plant species following the ground-disturbing activities. Weedy invasive species could compete with palmate-bracted bird's-beak for space, soil moisture, and nutrients, and could extirpate the species from the site over time. Any construction dust generated from ground-disturbing covered-activities in or adjacent to occupied habitat may adversely affect plant-photosynthesis, respiration, transpiration, pollination, and seed-set during that growing season, which would adversely affect the number of plants germinating in the next and subsequent growing seasons.

Compensation lands for effects to palmate-bracted bird's-beak will be located in areas that include occupied habitat. The specific conservation goals are to protect the only known extant population and conduct annual surveys to better document contraction and expansion of the population. The minimum ratio for compensation/mitigation for effects to the species and loss of habitat is 5:1 and may increase depending on the location of the project and the compensation, effects, and quality of habitat (see Appendix C and D of this Programmatic BO). The requirements (conservation easement, endowment, and management plan) and minimum ratio for compensation/mitigation for effects to individuals and habitat will ensure preservation of habitat that provides overall improved management and enhancement of the sites. These measures will assist in conserving blocks of contiguous habitat for the species and contribute to recovery goals for the species.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section

because they require separate consultation pursuant to section 7 of the Act.

The global average temperature has risen by approximately 0.6 degrees Celsius during the 20th Century (Intergovernmental Panel on Climate Change 2001, 2007; Adger *et al* 2007). There is an international scientific consensus that most of the warming observed has been caused by human activities (Intergovernmental Panel on Climate Change 2001, 2007; Adger *et al.* 2007), and that it is "very likely" that it is largely due to manmade emissions of carbon dioxide and other greenhouse gases (Adger *et al.* 2007). Ongoing climate change (Inkley *et al.* 2004; Kerr 2007; Adger *et al.* 2007; Kanter 2007) likely imperils these listed species and the resources necessary for their survival. Since climate change threatens to disrupt annual weather patterns, it may result in a loss of their habitat and/or prey, and/or increased numbers of their predators, parasites, and diseases. Where populations are isolated, a changing climate may result in local extinction, with range shifts precluded by lack of habitat.

Conclusion

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that projects which meet the qualifications for this Programmatic BO are not likely to jeopardize the continued existence of the longhorn fairy shrimp, vernal pool fairy shrimp, callippe silverspot butterfly, California red-legged frog, Central California tiger salamander, Alameda whipsnake, or San Joaquin kit fox. Although critical habitat for the longhorn fairy shrimp, vernal pool fairy shrimp, California red-legged frog, Central California tiger salamander, and Alameda whipsnake will be affected, none will be destroyed or adversely modified by the the projects that meeting the qualifications of the Programmatic BO. This determination is based on the Description of the Action that provides numerous measures by reference and additional minimization measures that would be implemented to minimize adverse effects of the future proposed projects on listed species and their critical habitats. Implementing the Conservation Strategy, including the standard mitigation/compensation ratios, ensures more occupied habitat will be conserved than affected.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Endangered Species Act directs Federal agencies to utilize their authorities to further the purposes of the Endangered Species Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information or data bases. The Service recommends the following actions:

1. The Corps through the applicant should assist the Service in implementing recovery actions identified in the *Recovery Plan for the California Red-legged Frog* (Service 2002).

2. The Corps through the applicant should assist the Service in developing and

implementing recovery actions for the San Joaquin kit fox identified in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (Service 1998).

3. The Corps through the applicant should assist the Service in developing and implementing recovery actions identified in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (Service 2005b).

4. Sightings of any listed or sensitive animal species should be reported to the CNDDB of the CDFG. A copy of the reporting form and a topographic map clearly marked with the location the animals were observed also should be provided to the Service.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION - CLOSING STATEMENT

This concludes of formal consultation on the implementation of the East Alameda County Conservation Strategy. As provided in 50 CFR 402.16, reinitiating of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must immediately cease, pending reinitiation.

If you have any questions regarding this biological opinion, please contact Kim Squires, Senior Endangered Species Biologist, or Ryan Olah, Coast Bay/Forest Foothills Division Chief, at the letterhead address, telephone (916) 414-6600, or electronic mail at Kim_Squires@fws.gov or Ryan_Olah@fws.gov.

Sincerely,

for Susan K. Moore
Field Supervisor

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Figure 1

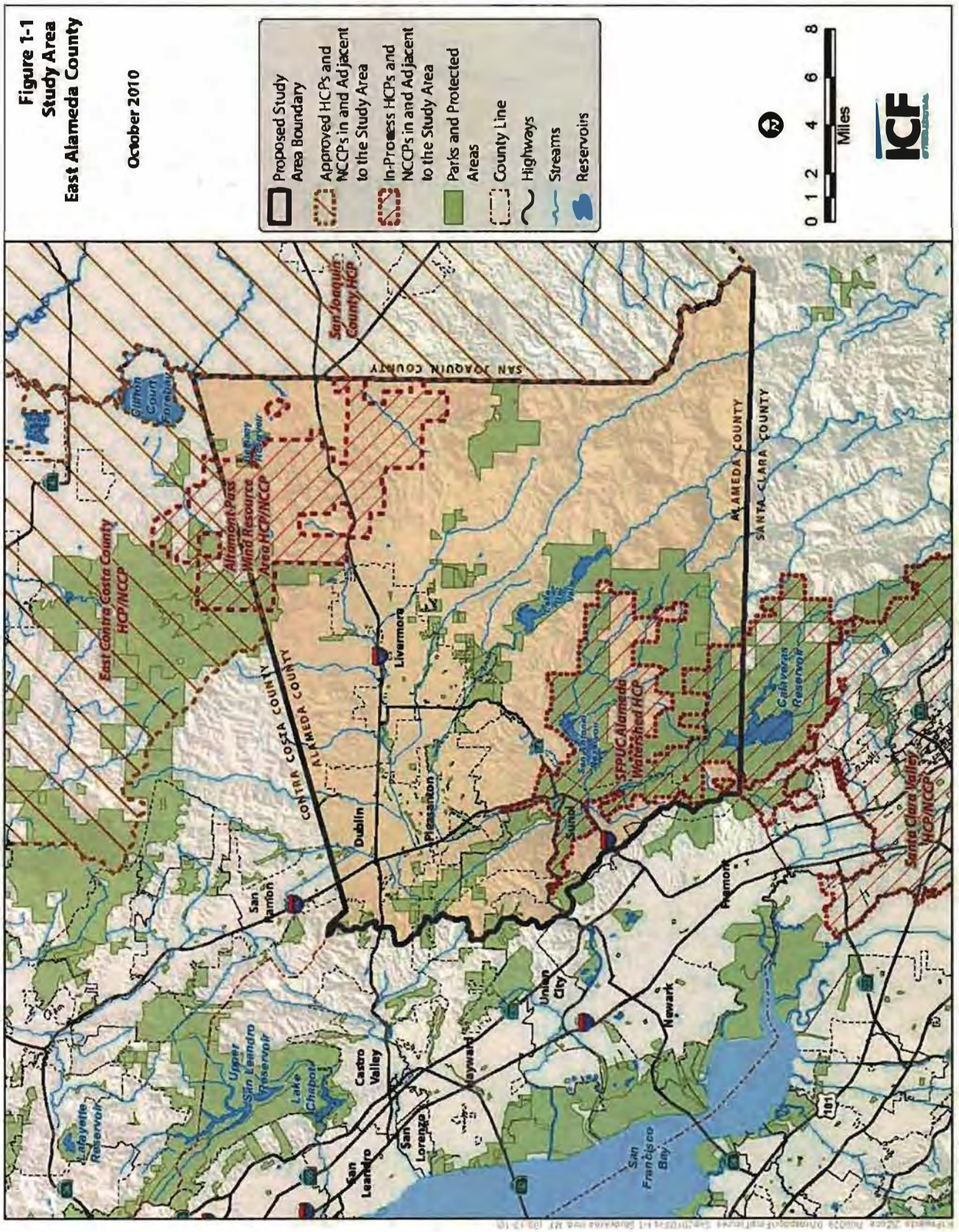
Figure 1-1
Study Area
East Alameda County
October 2010
Proposed Study Area Boundary
Approved HCPs and NCCPs in and Adjacent to the Study Area
In-Process HCPs and NCCPs and Adjacent to the Study Area
Parks and Protected Areas
County Line
Highways
Streams
Reservoirs
0 1 2 4 6 8
Miles
ICF
SAN JOAQUIN COUNTY
CONTRA COSTA COUNTY
ALAMEDA COUNTY
SANTA CLARA COUNTY
San Joaquin County HCP
East Contra Costa County HCP/NCCP
Altamont Pass Wind Resource Area HCP/NCCP
SFPUC Alameda Watershed HCP
Santa Clara Valley HCP/NCCP
Livermore
Dublin
Pleasanton
San Ramon
Sunol
Fremont
Newark
Union City
Hayward
Castro Valley
San Leandro
San Lorenzo
Lafayette Reservoir
Upper San Leandro Reservoir
Lake Chabot
Del Valle Reservoir
Calaveras Reservoir
San Antonio Reservoir
San Francisco Bay
101
580
680

Figure 2

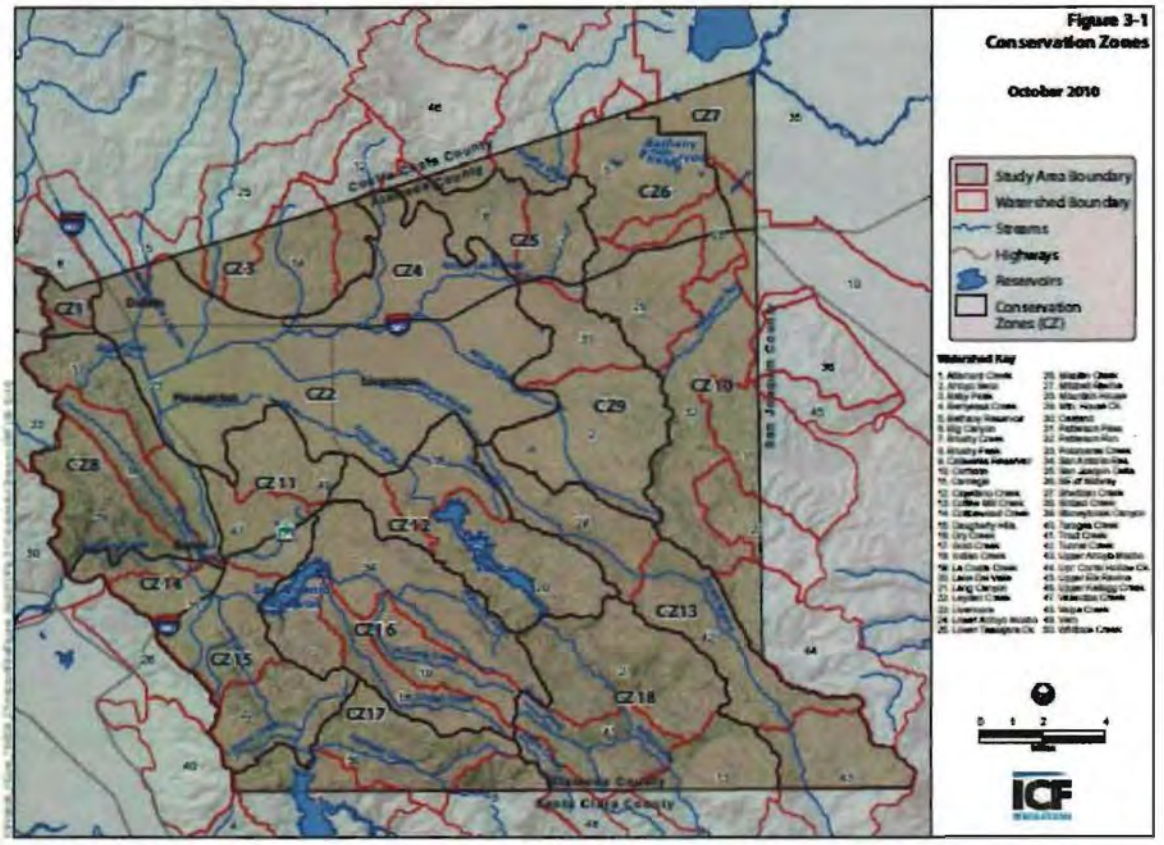
Figure 3-1
Conservation Zones
October 2010
Study Area Boundary
Watershed Boundary
Streams
Highways
Reservoirs
Conservation Zones (CZ)
Watershed Key
CZ1
CZ2
CZ3
CZ4
CZ5
CZ7
CZ8
CZ9
CZ10
CZ11
CZ12
CZ13
CZ14
CZ15
CZ16
CZ17
CZ18
CZ26
Contra Costa County
Alameda County
San Joaquin County
Stanislaus County
ICF

Appendix A

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

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

Appendix B

Table 3-3. Species-Specific AMMs

Species AMM	Species	Habitat	Avoidance and Minimization Measure
INV-1	Vernal pool fairy shrimp, longhorn fairy shrimp	Vernal pools/clay flats, alkaline pools/rock outcrops/sandstone pools	• A qualified biological monitor will be present if work is conducted outside of designated work corridors or off of existing access roads. • If vernal pools, clay flats, alkaline pools, ephemeral stock tanks, or sandstone pools, or roadside ditches are present, a qualified biologist will stake and flag an exclusion zone prior to construction activities. The exclusion zone will be fenced with orange construction zone and erosion control fencing (to be installed by construction crew). The exclusion zone will encompass the maximum practicable distance from the worksite and at least 250 feet from the aquatic feature wet or dry. • Work will be avoided after the first significant rain until June 1, or until pools remain dry for 72 hours. • No herbicide will be applied within 100 feet of exclusion zones, except when applied to cut stumps or frilled stems or injected into stems. No broadcast applications will be applied. • Avoid modifying or changing the hydrology of the habitat.
INV-2	Callippe silverspot butterfly	Grassland with host/nectar plants present	• No herbicide will be applied within 100 feet of host plant populations. Spot application to cut stumps, frilled stems, or injected into stems are acceptable. No broadcast applications will be applied. • Cut trees that are removed in the vicinity of host plants will be hand carried rather than dragged to disposal areas. • Avoid or minimize the removal of host plant, Johnny jump-up (*Viola pedunculata*) • Avoid work in suitable habitat during the flight and mating season (mid-May to mid-July); establish a minimum 50-foot buffer around host plants.
AMPH-1	Amphibians California tiger salamander California red-legged frog Foothill yellow-legged frog	Streams, wetlands, ponds, vernal pools	• If aquatic habitat is present, a qualified biologist will stake and flag an exclusion zone prior to activities. The exclusion zone will be fenced with orange construction zone and erosion control fencing (to be installed by construction crew). The exclusion zone will encompass the maximum practicable distance from the work site and at least 500 feet from the aquatic feature wet or dry.
AMPH-2	Amphibians California tiger salamander California red-legged frog Foothill yellow-legged frog	Riparian habitat and grasslands within 2-miles of aquatic habitat.	• A qualified biologist will conduct preconstruction surveys prior to activities define a time for the surveys (before ground breaking). If individuals are found, work will not begin until they are moved out of the construction zone to a USFWS/CDFG approved relocation site. • A Service-approved biologist should be present for initial ground disturbing activities. • If the work site is within the typical dispersal distance (contact USFWS/CDFG for

Table 3-3. Species-Specific AMMs

Species AMM	Species	Habitat	Avoidance and Minimization Measure
			latest research on this distance for species of interest) of potential breeding habitat, barrier fencing will be constructed around the worksite to prevent amphibians from entering the work area. Barrier fencing will be removed within 72 hours of completion of work. • No monofilament plastic will be used for erosion control. • Construction personnel will inspect open trenches in the morning and evening for trapped amphibians. • A qualified biologist possessing a valid ESA Section 10(a)(1)(A) permit or Service approved under an active biological opinion, will be contracted to trap and to move amphibians to nearby suitable habitat if amphibians are found inside fenced area. • Work will be avoided within suitable habitat from October 15 (or the first measurable fall rain of 1" or greater, to May 1.
REPT-1	Alameda whipsnake	Chaparral, scrub, grassland, riparian, oak woodland	• No monofilament plastic will be used for erosion control • Barrier fencing may be used to exclude focal reptiles. Barrier fencing will be removed within 72 hours of completion of work. • Construction crews or on-site biological monitor will inspect open trenches in the morning and evening for trapped reptiles. • Ground disturbance in suitable habitat will be minimized. • A USFWS and CDFG-approved biological monitor will be present for all ground disturbing activities in suitable habitat. • A qualified biologist possessing a valid ESA Section 10(a)(1)(A) permit or Service approved under an active biological opinion, and approved by CDFG will be contracted to trap and to move reptiles to nearby suitable habitat if listed reptiles are found inside fenced area.
BIRD-1	Golden eagle	Cliffs and large trees surrounded by open grassland.	• If an active nest is identified near a proposed work area work will be conducted outside of the nesting season (February 1 to September 1). • If an active nest is identified near a proposed work area and work cannot be conducted outside of the nesting season, a no-activity zone will be established by a qualified biologist. The no-activity zone will be large enough to avoid nest abandonment and will at a minimum be 250-feet radius from the nest. • If an effective no-activity zone cannot be established in either case, an experienced golden eagle biologist will develop a site-specific plan (i.e., a plan that considers the type and extent of the proposed activity, the duration and timing of the activity, the sensitivity and habituation of the eagles, and the dissimilarity of the proposed activity with background activities) to minimize the potential to affect the reproductive success of the eagles.

Table 3-3. Species-Specific AMMs

Species AMM	Species	Habitat	Avoidance and Minimization Measure
BIRD-2	Burrowing owl	Grasslands or ruderal areas with burrows	• If an active nest is identified near a proposed work area work will be conducted outside of the nesting season (March 15 to September 1). • If an active nest is identified near a proposed work area and work cannot be conducted outside of the nesting season, a no-activity zone will be established by a qualified biologist. The no-activity zone will be large enough to avoid nest abandonment and will at a minimum be 250-feet radius from the nest. • If burrowing owls are present at the site during the non-breeding period, a qualified biologist will establish a no-activity zone of at least 150 feet. • If an effective no-activity zone cannot be established in either case, an experienced burrowing owl biologist will develop a site-specific plan (i.e., a plan that considers the type and extent of the proposed activity, the duration and timing of the activity, the sensitivity and habituation of the owls, and the dissimilarity of the proposed activity with background activities) to minimize the potential to affect the reproductive success of the owls.
BIRD-3	Tricolored blackbird	Wetlands, ponds with emergent vegetation	• If an active nest colony is identified near a proposed work area work will be conducted outside of the nesting season (March 15 to September 1).
MAMM-1	San Joaquin kit fox, (American badger)	Grassland, generally with ground squirrel burrows	• If potential dens are present, their disturbance and destruction will be avoided. • If potential dens are located within the proposed work area and cannot be avoided during construction, qualified biologist will determine if the dens are occupied or were recently occupied using methodology coordinated with the USFWS and CDFG. If unoccupied, the qualified biologist will collapse these dens by hand in accordance with USFWS procedures (U.S. Fish and Wildlife Service 1999). • Exclusion zones will be implemented following USFWS procedures (U.S. Fish and Wildlife Service 1999) or the latest USFWS procedures available at the time. The radius of these zones will follow current standards or will be as follows: Potential Den—50 feet; Known Den—100 feet; Natal or Pupping Den—to be determined on a case-by-case basis in coordination with USFWS and CDFG. • Pipes will be capped and trenches will contain exit ramps to avoid direct mortality while construction areas is active.
FISH-1	Central California coast steelhead	Stream habitats	• If any life stage of any listed species may be present during in-water activities or substantial disturbance, capture, handling, exclusion, salvage, and relocation will be considered for the listed species. A take permit from NMFS would be required for this unless it is for emergency, then DFG. • With the exception of streams identified by NMFS, and CDFG as not supporting spawning habitat, conduct all in-water activities outside the spawning and incubation season for listed fish species or to periods identified in cooperation with NMFS, and CDFG to accommodate site-specific conditions.

Table 3-3. Species-Specific AMMs

Species AMM	Species	Habitat	Avoidance and Minimization Measure
			• Preserve stream width, depth, velocity, and slope that provide upstream and downstream passage of adult and juvenile salmonid fish according to NMFS and CDFG guidelines and criteria or as developed in cooperation with NMFS and CDFG to accommodate site-specific conditions. • Remove the minimum amount of wood, sediment and gravel, and other natural debris necessary to maintain and protect culvert and bridge function, ensure suitable fish passage conditions, and minimize disturbance of the streambed, using hand tools where feasible. • Instream woody material (IWM) subject to damage or removal shall be retained and replaced on site after project completion or used for other mitigation/restoration projects near the project site where feasible. • Minimize disturbed areas by locating temporary work areas to avoid patches of native aquatic vegetation, substantial large woody debris, and spawning gravel. • Where spawning gravel removal is temporary to support construction activities, replace spawning gravel to approximate the pre-construction conditions and using gravel removed from the site. • Gravel and LWD excavated from the channel that is temporarily stockpiled for reuse in the channel will be stored in a manner that prevents mixing with stream flows. • For diversion from streams, rivers, and other water bodies, any water intake structure shall be installed, operated, and maintained in accordance with NMFS, and DFG criteria for the species and life stages of concern or as developed in cooperation with NMFS, USFWS, and DFG to accommodate site-specific conditions. • Avoid extending existing areas of stream bank rock slope protection (RSP) or other bank protection (e.g., sheet piles) and limit the extent of bank and channel armoring to the minimum necessary to protect essential infrastructure. • Where rock slope protection (RSP) is necessary, incorporate native riparian vegetation and/or LWD in RSP. • Stream flow through new and replacement culverts, bridges, and over stream gradient control structures must meet the velocity depth, and other passage criteria for salmonid streams as described by NMFS and DFG guidelines or as developed in cooperation with NMFS and DFG to accommodate site-specific conditions. • Pile driving shall be conducted outside of the stream channel whenever feasible or practical. • Drive piles with a vibratory hammer when feasible. • For drop or hydraulic hammers, use the smallest pile driver and the minimum force necessary to complete the work – set the hammer drop height to the minimum necessary to drive the pile. • Where listed species cannot be captured, handled, excluded, or relocated (e.g.,

Table 3-3. Species-Specific AMMs

Species AMM	Species	Habitat	Avoidance and Minimization Measure
			salmonid redd), avoid or delay actions that could injure or kill individual organism until the species leaves the affected area or the organism reaches a stage that can be captured, handled, excluded, or relocated . This activity would need to be coordinated with NMFS and the biologist conducting the work would need a take permit. • Within occupied habitat, capture, handling, exclusion, and relocation activities shall be completed no earlier than 48 hours before construction begins to minimize the probability that listed species will recolonize the affected areas. This activity would need to be coordinated with NMFS and the biologist conducting the work would need a take permit. • Within temporarily drained stream channel areas, salvage activities shall be initiated before or at the same time as stream area draining and completed within a time frame necessary to avoid injury and mortality of listed species. This activity would need to be coordinated with NMFS and the biologist conducting the work would need a take permit.

Appendix C

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

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

[1] Reference Figure 3-7 for the location of key mitigation features for longhorn fairy shrimp.

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

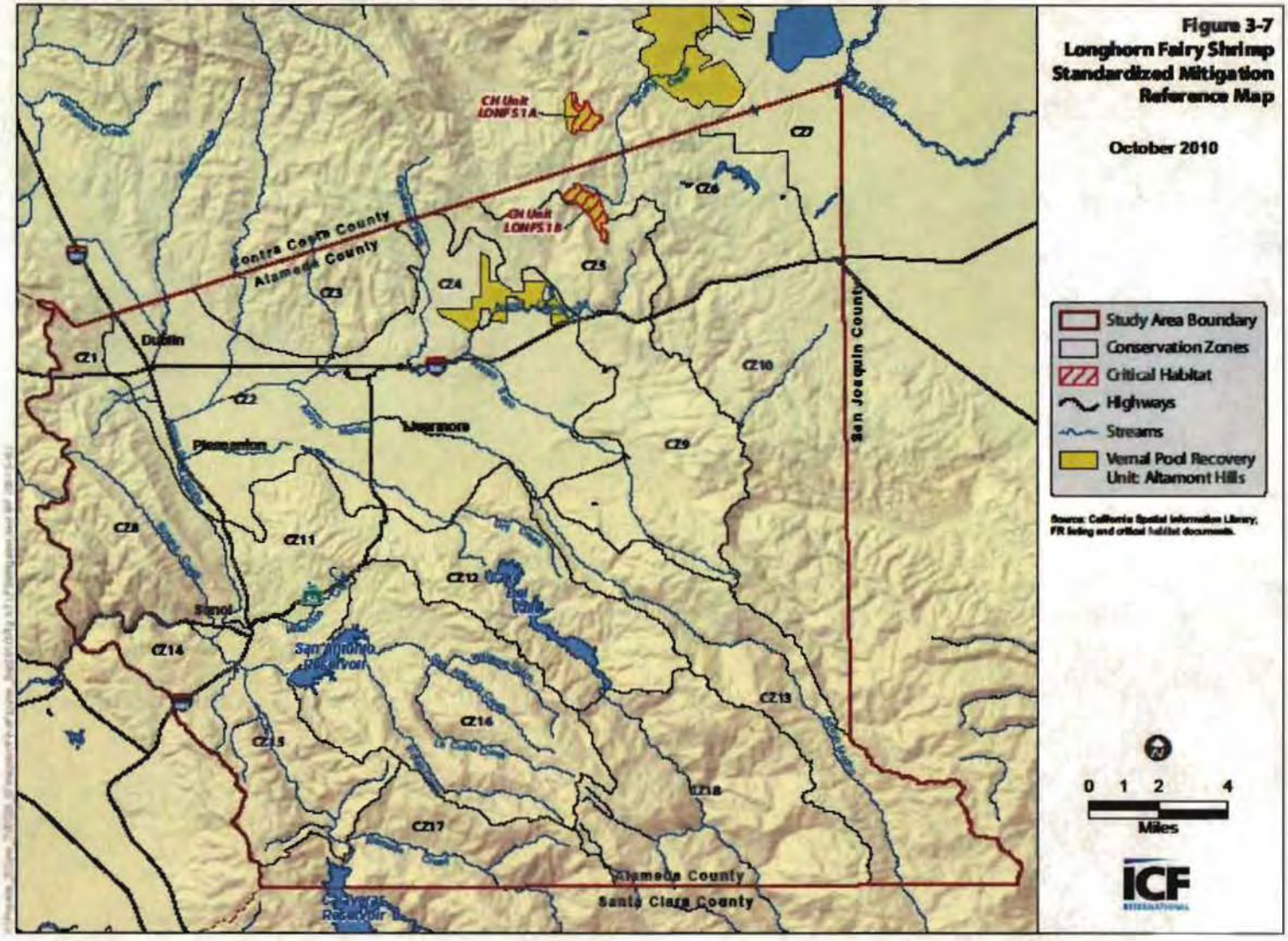
CH Unit LONFS1A
CH Unit LONFS1B
Contra Costa County
Alameda County
Dublin
Livermore
Pleasanton
Sunol
San Antonio Reservoir
Del Valle Reservoir
Alameda County
Santa Clara County
San Joaquin County
CZ1
CZ2
CZ3
CZ4
CZ5
CZ6
CZ7
CZ8
CZ9
CZ10
CZ11
CZ12
CZ13
CZ14
CZ15
CZ16
CZ17
CZ18
Figure 3-7
Longhorn Fairy Shrimp
Standardized Mitigation
Reference Map
October 2010
Study Area Boundary
Conservation Zones
Critical Habitat
Highways
Streams
Vernal Pool Recovery Unit: Altamont Hills
Source: California Spatial Information Library; FR listing and critical habitat documents.
0 1 2 4
Miles
ICF

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

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

[1] Reference Figure 3-6 for the location of key mitigation features for vernal pool fairy shrimp.

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

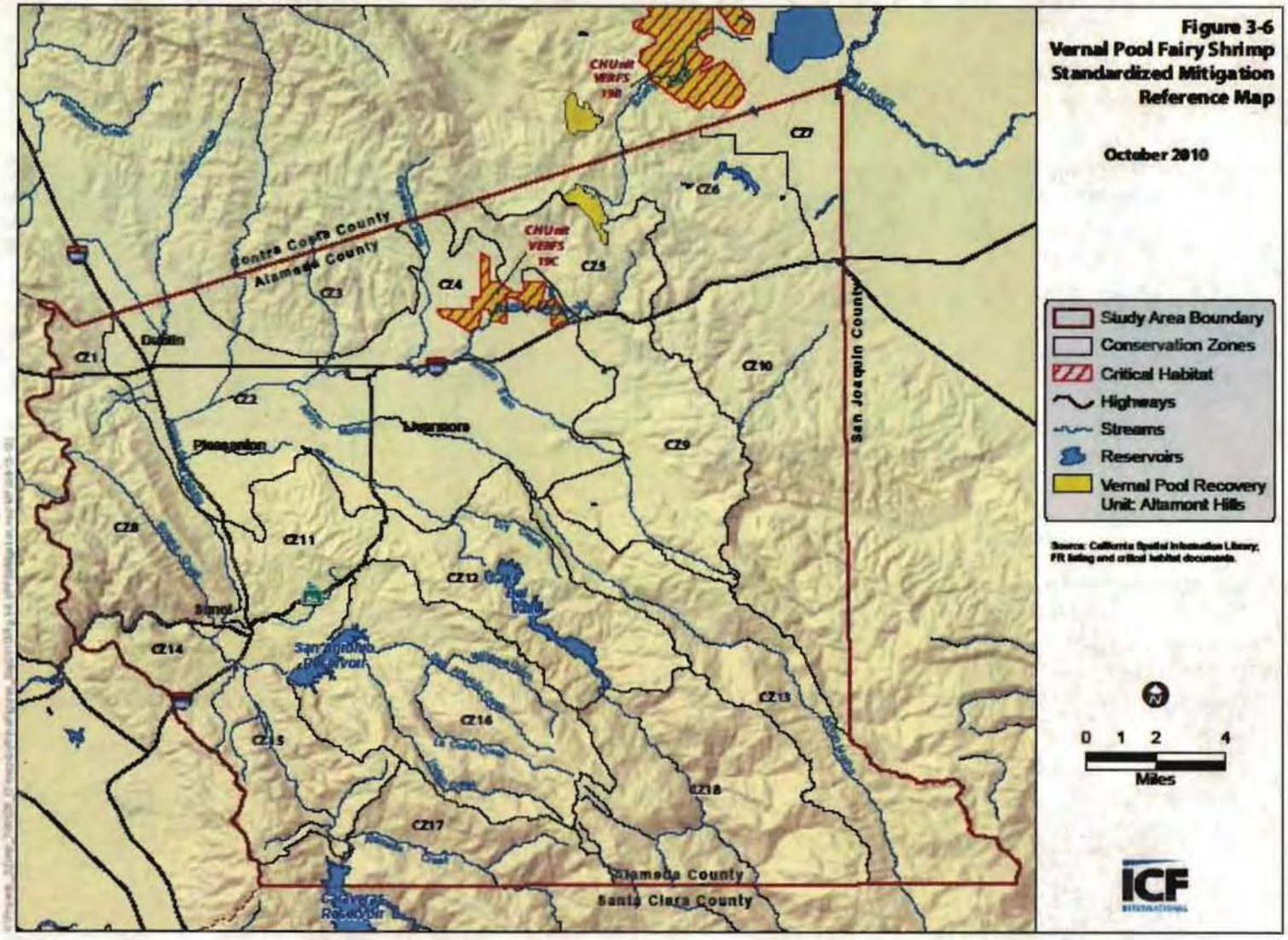
Figure 3-6
Vernal Pool Fairy Shrimp
Standardized Mitigation
Reference Map
October 2010
CHUnit VERFS 19B
CHUnit VERFS 19C
Contra Costa County
Alameda County
San Joaquin County
Dublin
Pleasanton
Livermore
Sunol
Alameda County
Santa Clara County
CZ1
CZ2
CZ3
CZ4
CZ5
CZ6
CZ7
CZ8
CZ9
CZ10
CZ11
CZ12
CZ13
CZ14
CZ15
CZ16
CZ17
CZ18
Study Area Boundary
Conservation Zones
Critical Habitat
Highways
Streams
Reservoirs
Vernal Pool Recovery Unit: Altamont Hills
Source: California Spatial Information Library; FR listing and critical habitat documents.
0 1 2 4
Miles
ICF

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

	Location of Mitigation[1,2]				
Location of Impact	Within CZ where impact occurred	Adjacent to CZ where impact occurred and inside mitigation area shown in Figure 3-8	In CZ Not Adjacent to CZ where impact occurred but inside mitigation area shown in Figure 3-8	Outside mitigation area shown in Figure 3-8 including an area outside EACCS Study Area	Notes
Inside Conservation Zones CZ1, CZ8, CZ11, CZ12, CZ14, CZ15, CZ16	3:1	3.5:1	4:1	Requires site-specific agency approval	

[1] Reference Figure 3-8 for the location of key mitigation features for callippe silverspot butterfly.

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

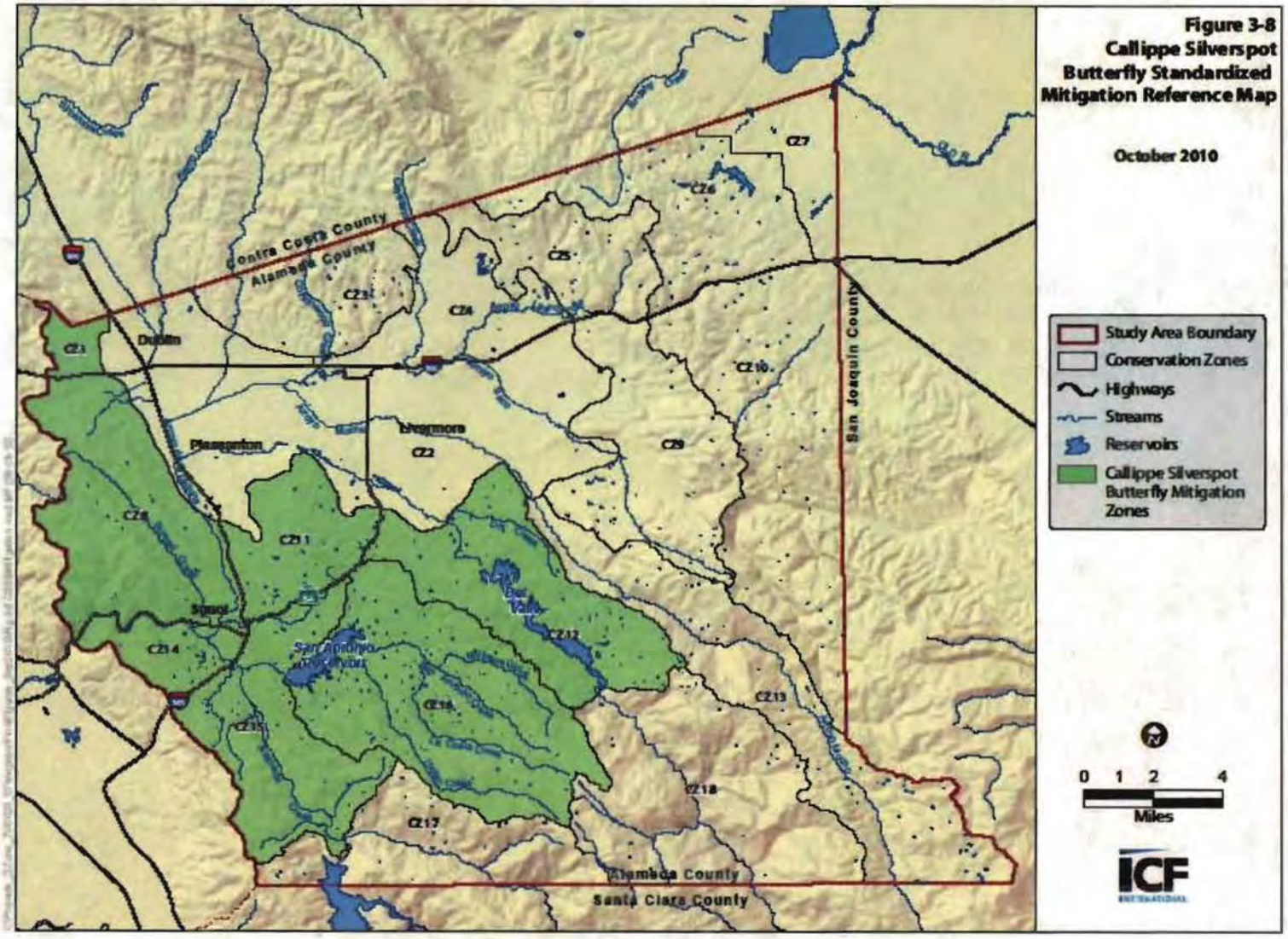
Figure 3-8
Callippe Silverspot Butterfly Standardized Mitigation Reference Map
October 2010
Contra Costa County
Alameda County
San Joaquin County
Alameda County
Santa Clara County
Dublin
Pleasanton
Livermore
Study Area Boundary
Conservation Zones
Highways
Streams
Reservoirs
Callippe Silverspot Butterfly Mitigation Zones
0 1 2 4
Miles
ICF

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

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

[1] Reference Figure 3-9 for the location of key mitigation features for California red-legged frog.

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

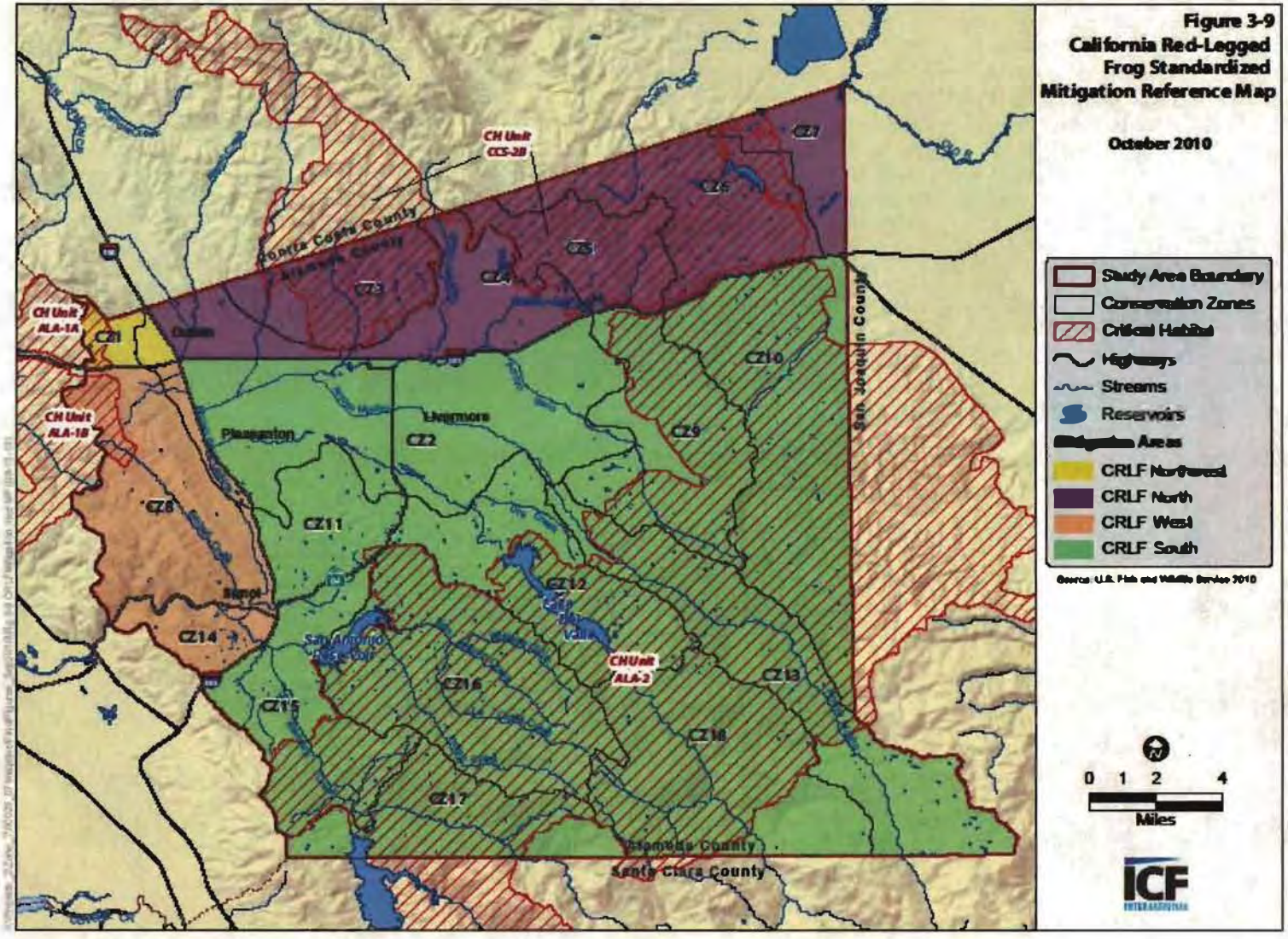
Figure 3-9
California Red-Legged Frog Standardized Mitigation Reference Map
October 2010
Study Area Boundary
Conservation Zones
Critical Habitat
Highways
Streams
Reservoirs
Mitigation Areas
CRLF Northwest
CRLF North
CRLF West
CRLF South
Source: U.S. Fish and Wildlife Service 2010
CH Unit CCS-3B
CH Unit ALA-1A
CH Unit ALA-1B
CH Unit ALA-2
CZ1
CZ2
CZ3
CZ4
CZ5
CZ6
CZ7
CZ8
CZ9
CZ10
CZ11
CZ12
CZ13
CZ14
CZ15
CZ16
CZ17
CZ18
Contra Costa County
Alameda County
San Joaquin County
Stanislaus County
Santa Clara County
Pleasanton
Livermore
Dublin
Sunol
San Antonio Reservoir
Calaveras Reservoir
0 1 2 4
Miles
ICF

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

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

[1] Reference Figure 3-10 for the location of key mitigation features for California tiger salamander.

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

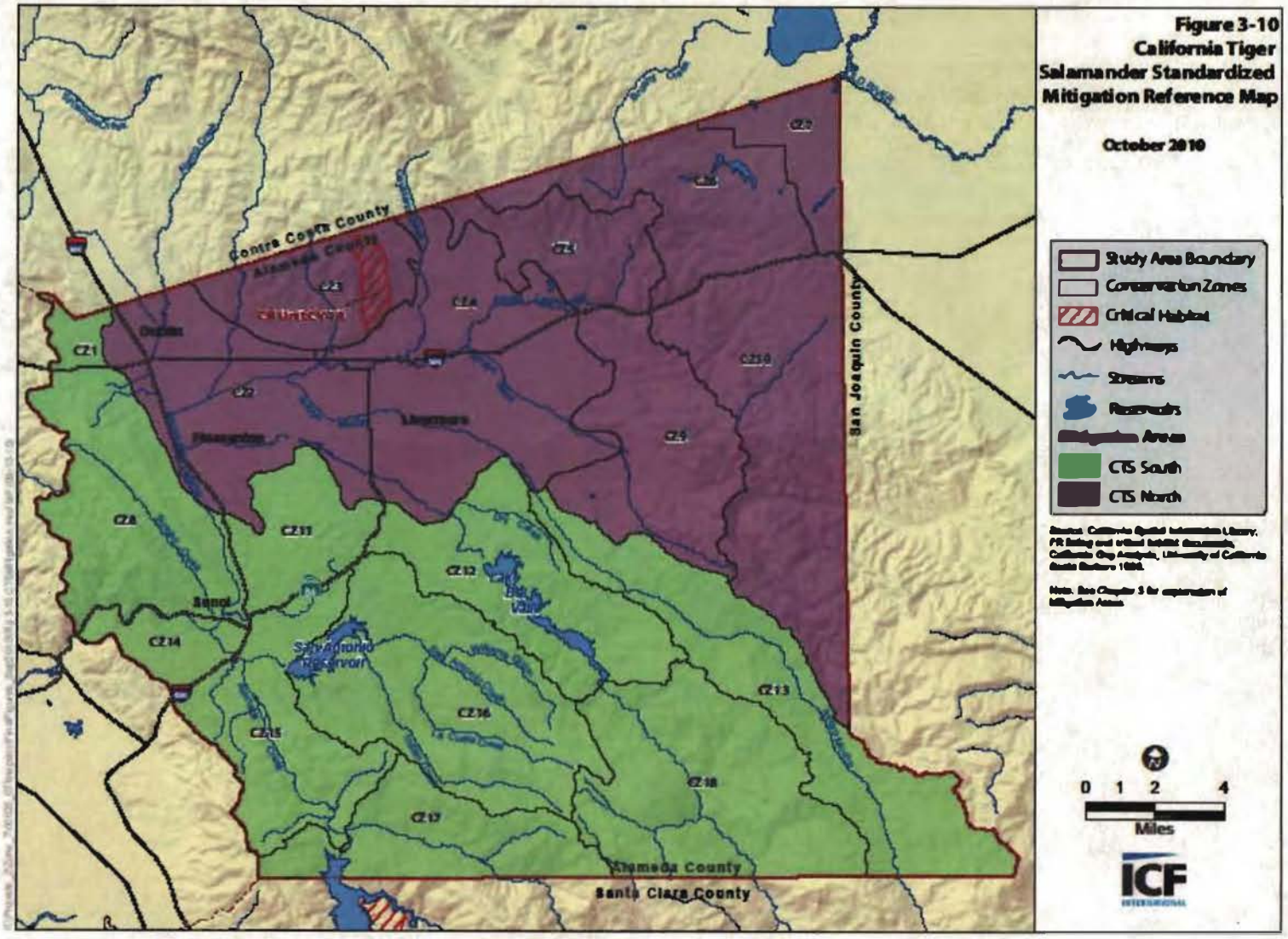
Figure 3-10
California Tiger
Salamander Standardized
Mitigation Reference Map
October 2010
Study Area Boundary
Conservation Zones
Critical Habitat
Highways
Streams
Reservoirs
Mitigation Areas
CTS South
CTS North
Contra Costa County
Alameda County
San Joaquin County
Santa Clara County
CZ1
CZ2
CZ3
CZ4
CZ5
CZ6
CZ7
CZ8
CZ9
CZ10
CZ11
CZ12
CZ13
CZ14
CZ15
CZ16
CZ17
CZ18
Livermore
Pleasanton
Sunol
Del Valle
Reservoir
0 1 2 4
Miles
ICF

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

	Location of Mitigation[1]						
Location of Impact[1]	Inside Critical Habitat Unit in same recovery unit[2]	Inside Critical Habitat Unit in different recovery unit	Outside Critical Habitat but Inside Same Recovery Unit	Outside Critical Habitat and Inside Different Recovery Unit	Outside Critical Habitat and Outside Recovery Unit	Outside EACCS Study Area	No
Inside Critical Habitat	3:1	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	Requires site-specific agency approval	
Outside Critical Habitat but Inside Recovery Unit	2.5:1	3:1	3:1	3.5:1	4:1	Requires site-specific agency approval	
Outside Critical Habitat and Outside Recovery Unit	2.5:1	2.5:1	3:1	3:1	3:1	Requires site-specific agency approval	

[1] Reference Figure 3-12 for the location of key mitigation features for Alameda whipsnake.

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

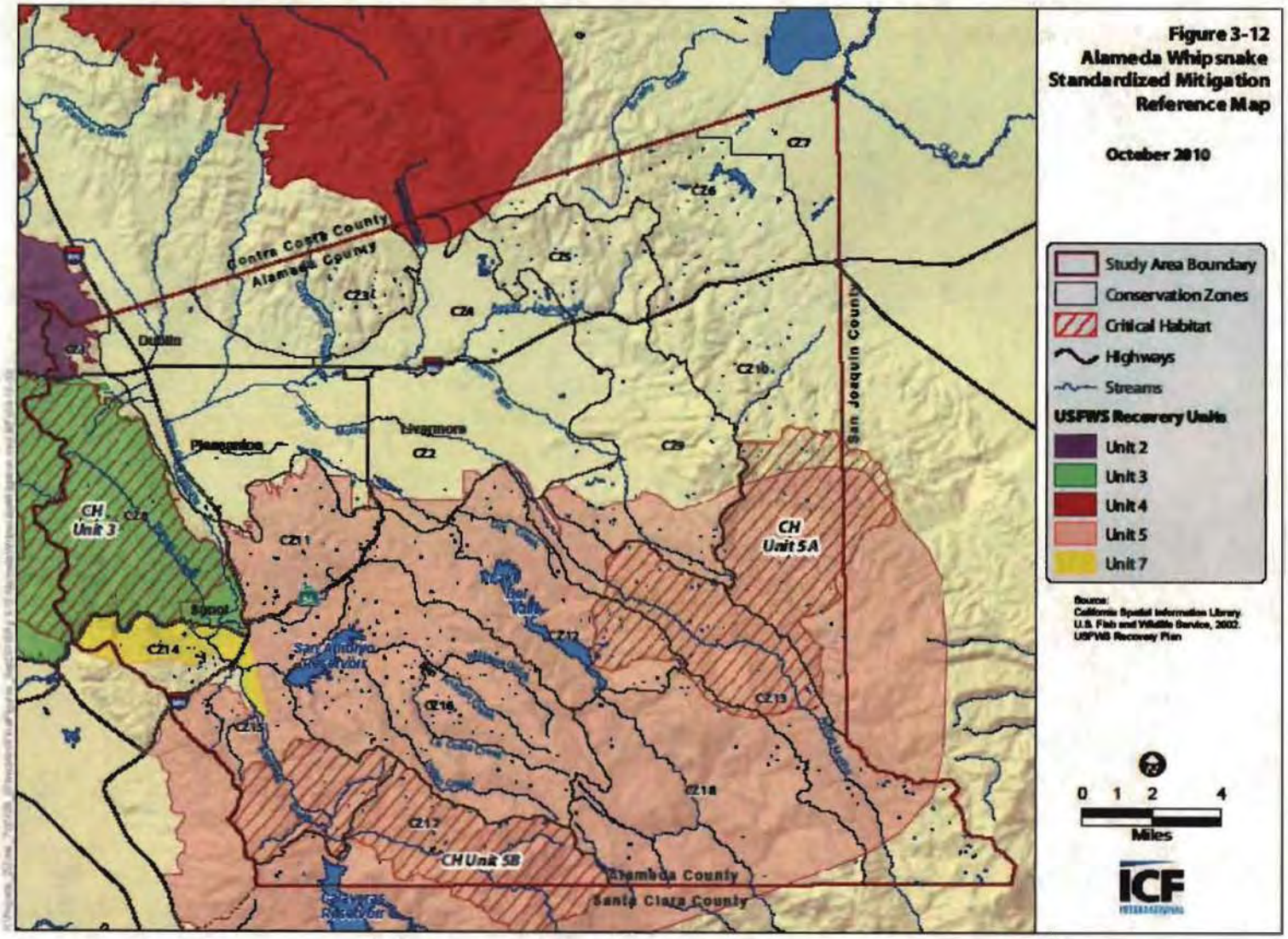
Figure 3-12
Alameda Whipsnake
Standardized Mitigation
Reference Map
October 2010
Study Area Boundary
Conservation Zones
Critical Habitat
Highways
Streams
USFWS Recovery Units
Unit 2
Unit 3
Unit 4
Unit 5
Unit 7
Source:
California Spatial Information Library
U.S. Fish and Wildlife Service, 2002.
USFWS Recovery Plan
0 1 2 4
Miles
ICF
Contra Costa County
Alameda County
San Joaquin County
Santa Clara County
Dublin
Pleasanton
Livermore
Sunol
CH Unit 3
CH Unit 5A
CH Unit 5B
CZ1
CZ2
CZ3
CZ4
CZ5
CZ6
CZ7
CZ8
CZ9
CZ10
CZ11
CZ12
CZ13
CZ14
CZ15
CZ16
CZ17
CZ18

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

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

[1] Reference Figure 3-13 for the location of mitigation areas for San Joaquin kit fox.

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

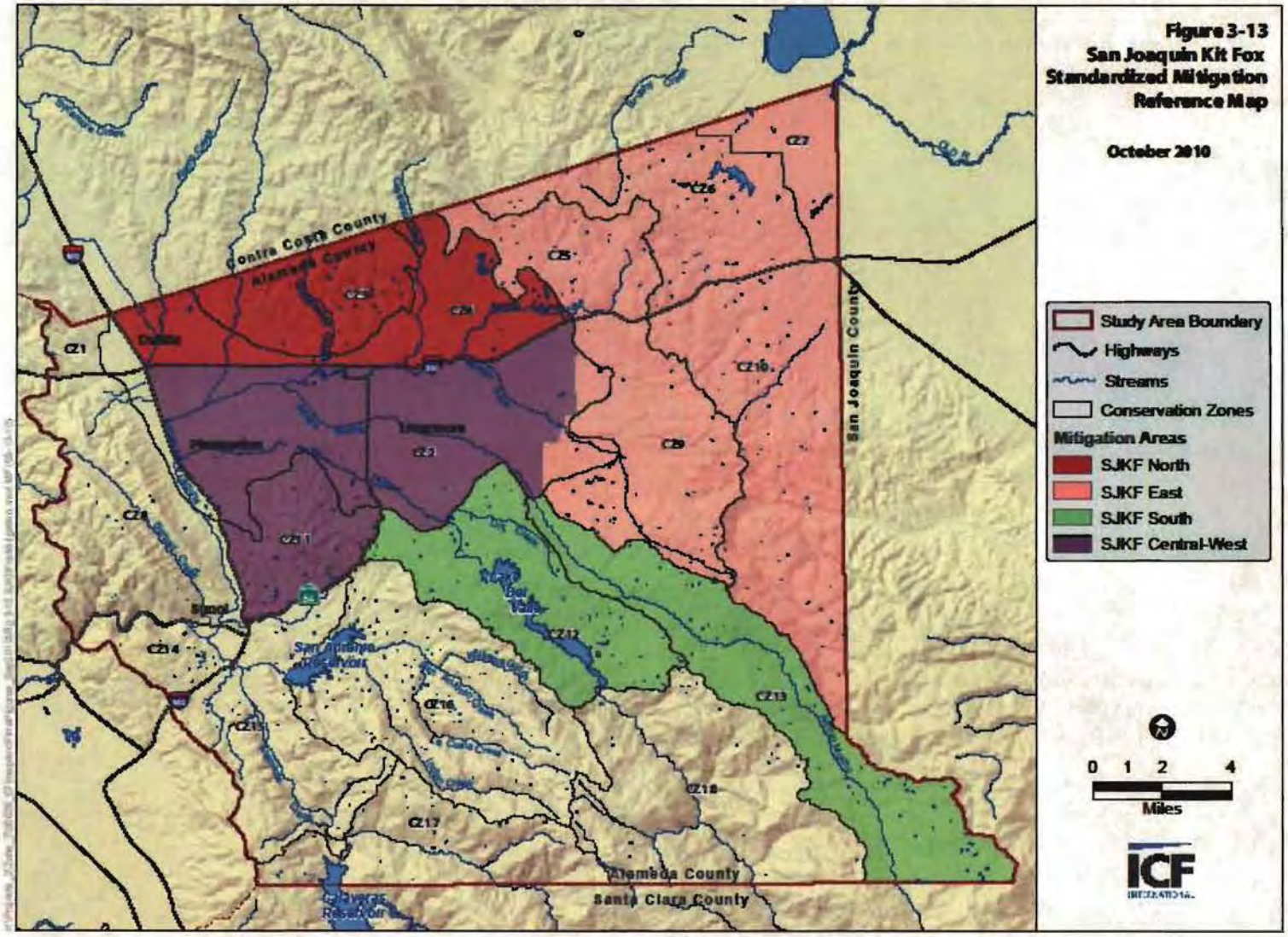
Figure 3-13
San Joaquin Kit Fox
Standardized Mitigation
Reference Map
October 2010
Study Area Boundary
Highways
Streams
Conservation Zones
Mitigation Areas
SJKF North
SJKF East
SJKF South
SJKF Central-West
Contra Costa County
Alameda County
San Joaquin County
Alameda County
Santa Clara County
0 1 2 4
Miles
ICF

Table 3-12. Standardized Mitigation Ratios for Focal Plant Species in the EACCS Study Area[1]

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

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

[2] Reference Figure 3-11 for the location of key mitigation features for plants and non-listed species in the EACCS study area.

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

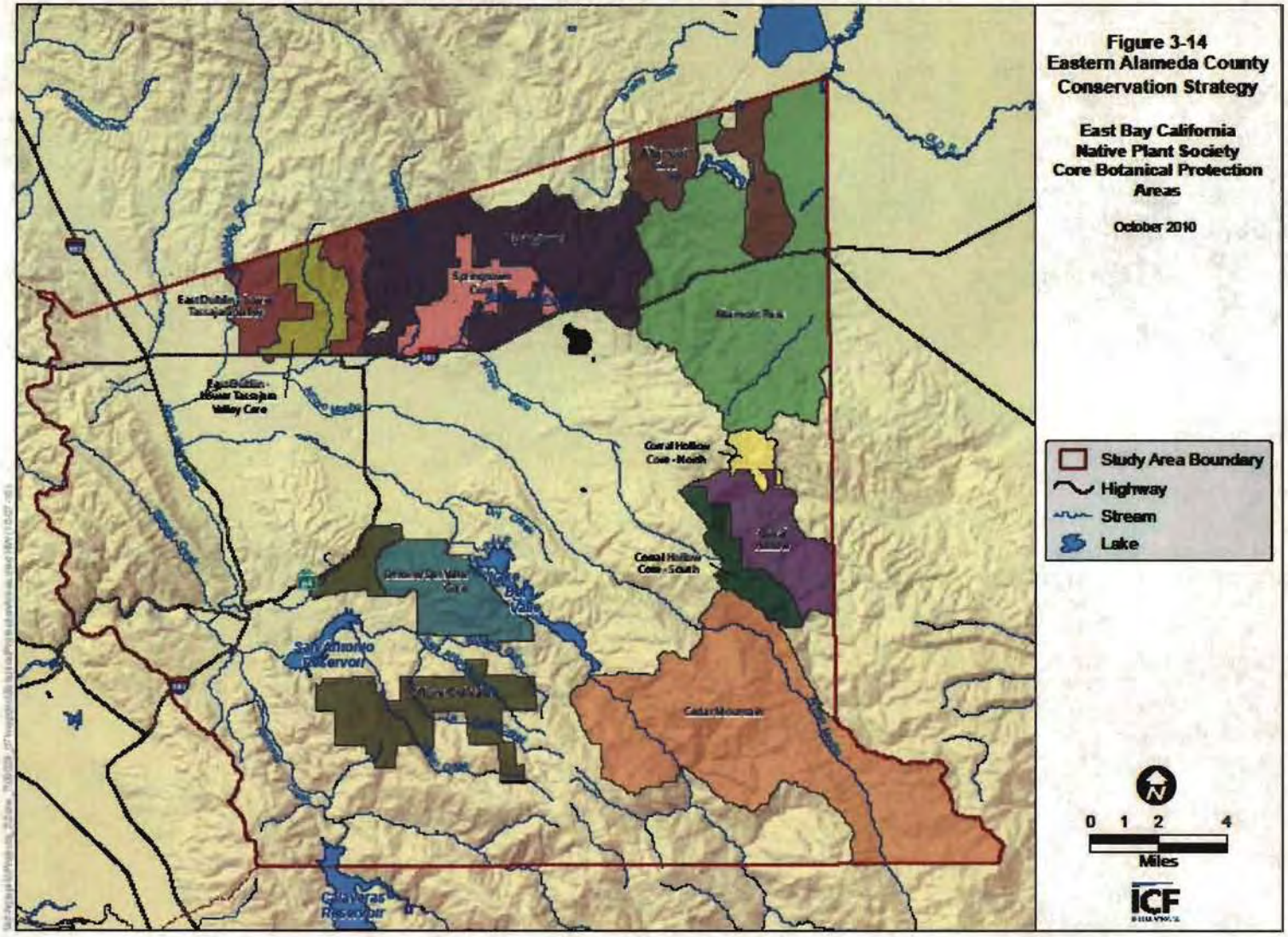
Figure 3-14
Eastern Alameda County
Conservation Strategy
East Bay California
Native Plant Society
Core Botanical Protection
Areas
October 2010
Study Area Boundary
Highway
Stream
Lake
0 1 2 4
Miles
ICF

Appendix D

Table E-1. Impact/Mitigation Scoring for vernal pool fairy shrimp in the EACCS study area.

Vernal pool fairy shrimp	**5**	**4**	**3**	**2**	**1**	**0**	**Score**
Closest suitable vernal pool habitat to impact/mitigation area	On-site	Within 250 feet	Greater than 250 feet but hydrologically connected	--	--	Greater than 250-feet and not hydrologically connected	
Aquatic land covers impacted/ mitigated	Vernal pools	Other aquatic features that can support species	--	--	--	All others; none	
Upland land covers impacted/ mitigated	Grassland	Oak woodland, Rural residential, ruderal	--	--		All others; none	
Does project effect/protect hydrology in the watershed in a way that would degrade/improve vernal pool habitats downstream	Yes					No	
Inside Altamont Hills Core Area identified in Vernal Pool Recovery Plan	Yes					No	
Inside designated Critical Habitat	Yes	--	--	--	--	No	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-4. Habitat quality of the impact site would be scored using this table and the habitat quality of a mitigation site would need to meet or exceed that value.

Table E-2. Impact/Mitigation Scoring for longhorn fairy shrimp in the EACCS study area.

Longhorn fairy shrimp	5	4	3	2	1	0	Score
Closest suitable vernal pool/sandstone pool habitat to impact/ mitigation area	On-site	Within 250 feet	-- Greater than 250 feet but hydrologically connected	--	--	Greater than 250-feet and not hydrologically connected	
Aquatic land covers impacted/ mitigated	Sandstone pools	Vernal pools	Other aquatic features that can support species	--	--	All others; none	
Upland land covers impacted/ mitigated	Grassland	Oak woodland, Rural residential, ruderal	--	--		All others; none	
Does project effect/protect hydrology in the watershed in a way that would degrade/improve vernal pool habitats downstream	Yes					No	
Inside Altamont Hills Core Area identified in Vernal Pool Recovery Plan	Yes					No	
Inside designated Critical Habitat	Yes	--	--	--	--	No	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-5. Habitat quality of the impact site would be scored using this table and the habitat quality of a mitigation site would need to meet or exceed that value.

Table E-3. Impact/Mitigation Scoring for Callippe silverspot butterfly in the EACCS study area.

Callippe silverspot butterfly	5	4	3	2	1	0	Score
Impact/ Mitigation occurs in:	CZ1/CZ8/CZ11/ CZ12/CZ14/CZ 15/CZ16	--	--	--	--	All others	
Presence of host/nectar plants	On-site	Within 0.25-mile of site	>0.25-mile but <0.5-mile	--	--	> 0.5-mile	
Land covers impacted/ mitigated	--	--	Grassland	Oak woodland	--	All others	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							
Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-6. Habitat quality of the impact site and the mitigation site would be scored using this table.							

Table E-4. Impact/Mitigation Scoring for California tiger salamander in the EACCS study area.

California tiger salamander	5	4	3	2	1	0	Score
Closest suitable breeding habitat to site	On-site	Within 500 feet	Between 501 – 1,600 feet	Between 1,601 –2,050 feet	Between 2051–6,900 feet	Greater than 6,900 feet	
Is there occupied habitat within 6,900 feet of site?	Yes	--	--	No	--	--	
Aquatic land covers impacted/ mitigated	Wetland, Ponds	--	Stream/River	--	--	All others; none	
Upland land covers impacted/ mitigated	Grassland, Oak woodland, Rural residential	Chaparral/ Scrub	Riparian	Conifer woodland	ruderal without refugia habitat	All others; none	
Elevation	Below 3,700 feet	--	--	--	--	Above 3,700 feet	
Presence of ground squirrels/pocket gophers	On site	Within 1,350 feet of site	Between >1,351 but <2,650 feet	Between >2,651 bu <5,300 feet	Between >5,301 but <7,900 feet	> 7,901 feet from site	
Presence of bullfrogs or non-native fish in aquatic resources on site	No	--	Low number; not all aquatic habitats occupied	--	Yes, occurring in high numbers	--	
Create a new barrier between breeding and upland habitat	Documented breeding location	--	Potential breeding location	--	--	No	
Protect linkage between breeding and upland habitat	Documented breeding location	--	Potential breeding location	--	--	No	
Inside designated Critical Habitat	Yes	--	--	--	--	No	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-8. Habitat quality of the impact site and the mitigation site would be scored using this table.

Table E-5. Impact/Mitigation Scoring for California red-legged frog in the EACCS study area.

California red-legged frog	5	4	3	2	1	0	Score
Closest suitable breeding habitat to site	On-site	< 1-mile	>1-mile but< 2-miles	--	--	Greater than 2-miles	
Is there occupied habitat within 2-miles of site?	Yes	--	--	No	--	--	
Aquatic land covers impacted/ mitigated	Wetland, Ponds, Stream/River	--	--	--	--	All others; none	
Upland land covers impacted/ mitigated	Riparian, Grassland, Oak woodland, Rural residential	Chaparral/ Scrub	Conifer woodland	Cultivated ag, ruderal	--	All others; none	
Elevation	Below 3,500 feet	--	--	--	--	Above 3,500 feet	
Presence of ground squirrels or other burrowing mammals	On site	< 0.25-mile of site	> 0.25 but ≤ 0.5 miles	> 0. 5 but ≤ 1.0 miles	> 1.0 but ≤ 1.5 miles	> 1.5 miles	
Presence of bullfrogs or non-native fish in aquatic resources on site	No	--	Low numbers and not all aquatic habitats are occupied	--	Yes, occurring in high numbers	--	
Create a new barrier between breeding and upland habitat	Documented breeding location	--	Potential breeding location	--	--	No	
Protect linkage between breeding and upland habitat	Documented breeding location	--	Potential breeding location	--	--	No	
Inside East San Francisco Bay core recovery area	Yes					No	
Inside designated Critical Habitat	Yes	--	--	--	--	No	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-7. Habitat quality of the impact site and the mitigation site would be scored using this table.

Table E-7. Impact/Mitigation Scoring for Alameda whipsnake in the EACCS study area.

Alameda whipsnake	5	4	3	2	1	0	Score
Inside Core Recovery Unit reported in draft Recovery Plan	Yes	--	--	--	--	No	
Inside designated Critical Habitat	Yes	--	--	--	--	No	
High quality shrub habitat (scrub/chaparral especially; on northeast, east, south east, south and southwest Aspects) within one mile of subject site	Yes	--	--	--	No	--	
Land covers impacted/ mitigated	Chaparral/ Scrub	Grassland, Oak Woodland	Riparian	Conifer Woodland	--	All others	
Presence of rock outcrops	On-site	≤ 0.5-mile	≥ 0.5 but < 1-mile	--	--	> 1 mile	
Presence of important movement corridor reported in draft Recovery Plan	On-site	≤ 0.5-mile	≥ 0.5 but < 1-mile	--	--	> 1 mile	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-9. Habitat quality of the impact site and the mitigation site would be scored using this table.

Table E-11. Impact/Mitigation Scoring for San Joaquin kit fox and America badger in the EACCS study area.

San Joaquin kit fox/American badger	5	4	3	2	1	0	Score
Impact/ Mitigation occurs in:	CZ5CZ6/CZ7/ CZ9/CZ10	--	--CZ4 or CZ13	--	--CZ2, CZ3, CZ11, CZ12	--	
Land covers impacted/ mitigated	Grassland, Rural residential	Chaparral/ Scrub	Oak woodland, Cultivated Ag	Seasonal wetlands, Orchard	, ruderal	All others	
Average Slope	0-5%	> 5 but < 10%	≥ 10 but < 25%	≥25%	--	All others	
Presence of ground squirrels	On site	Within 0.25-mile of site	Within 0.5-mile of site	--	--	Further away	
Linkages and movement	Creation or removal of potential linkage across barrier (e.g. culvert under freeway)	Land adjacent to potential linkage on both sides of barrier (e.g., culvert under freeway)	Land adjacent to potential linkage on one side of barrier (e.g., culvert under freeway)	Land not adjacent to key linkage for species.	--	--	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							
Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-11. Habitat quality of the impact site and the mitigation site would be scored using this table.							

Table E-16. Impact/Mitigation Scoring for Palmate-bracted bird's beak in the EACCS study area.

Palmate-bracted bird's beak	5	4	3	2	1	0	Score
Conservation Zones	Inside CZ4	--	--	--	--	Other CZ	
Elevation	Below 500 feet	--	--	--		Above 500 feet	
Land covers impacted/ mitigated	chenopod scrub	Annual grassland,	--	Rural residential, ruderal	--	All others	
Does project effect/protect hydrology in the watershed in a way that would degrade/improve vernal pool habitats downstream	Yes					No	
Soils present in impact area	Alkali soils	--	--	--	--	others	
Within EBCNPS Priority Plant Protection Area	Yes	--	No	--	--	--	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							
Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-12. Habitat quality of the impact site and the mitigation site would be scored using this table.							