

TABLE OF CONTENTS

EXECUTIVE SUMMARY	S-1
S.1 INTRODUCTION.....	S-1
S.2 BACKGROUND.....	S-1
S.2.1 Purpose.....	S-2
S.2.2 Planning Process	S-2
S.2.3 Plan Area and Covered Activities	S-2
S.2.4 Covered Activity Zones	S-3
S.2.5 Covered Activities.....	S-3
S.3 BIOLOGICAL RESOURCES	S-4
S.3.1 Natural Communities	S-4
S.3.1.1 Valley Floor Grassland and Vernal Pool Natural Community	S-4
S.3.1.2 Inner Coast Range Natural Community	S-4
S.3.1.3 Riparian, Stream, and Freshwater Marsh Natural Community	S-5
S.3.1.4 Coastal Marsh Natural Community.....	S-5
S.3.1.5 Agricultural Lands	S-5
S.3.2 Covered Species	S-5
S.3.3 Special Management Species	S-6
S.4 CONSERVATION ANALYSIS	S-6
S.5 CONSERVATION STRATEGY	S-6
S.5.1 Reserve System	S-7
S.6 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES	S-8
S.6.1 Avoidance and Minimization Measures.....	S-8
S.6.2 Mitigation Requirements.....	S-9
S.7 ADAPTIVE MANAGEMENT	S-9
S.8 MONITORING	S-9
S.9 IMPACT ASSESSMENT	S-10
S.10 PLAN IMPLEMENTATION.....	S-10
S.10.1 Governance	S-10
S.10.2 Plan Participant Committee.....	S-11
S.10.3 HCP Advisory Committee	S-11
S.10.4 HCP Technical Review Committee	S-11
S.11 DEVELOPMENT OF THE RESERVE SYSTEM.....	S-12
S.12 FUNDING.....	S-12

TABLES

Table S.1: Covered Species, Special Management Species, and Natural Community Associations	S-14
Table S.2: Conservation Strategy Goals and Objectives	S-17
Table S.3: Avoidance and Minimization Measures.....	S-26
Table S.4: Mitigation Measures	S-57



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EXECUTIVE SUMMARY

S.1 INTRODUCTION

The Solano Habitat Conservation Plan (HCP) establishes a framework for complying with State and Federal endangered species regulations while accommodating future urban growth, development of infrastructure, and ongoing operation and maintenance activities associated with flood control, irrigation facilities, and other public infrastructure undertaken by or under the permitting authority/control of the Plan Participants within Solano County (also known in the HCP as the County) over the next 30 years. These Covered Activities are associated with:

- **Urban Development**
 - 16,479 acres (ac) of urban development within the Urban Growth Boundaries (UGBs) of Dixon, Fairfield, Rio Vista, Suisun City, Vacaville, and Vallejo in Covered Activity Zone 1
 - 1,631 ac of secondary support development such as communication service facilities, flood control facilities, roads, and recreation facilities outside of the city UGBs and Preapproved Activities in Covered Activity Zone 1
- **Ongoing Operation, Maintenance, and New Construction of Plan Participant Facilities**
 - 107 miles (mi) of new irrigation and flood control facilities for the Solano County Water Agency (SCWA), Solano Irrigation District (SID), Maine Prairie Water District (MPWD), Reclamation District No. 2068 (RD 2068), Dixon Resource Conservation District (Dixon RCD), Dixon Regional Watershed Joint Powers Authority (DRW JPA), Vallejo Sanitation and Flood Control District (VSFCD), and Fairfield-Suisun Sewer District (FSSD)
 - 866 mi of streams, flood control channels, irrigation ditches, pipelines, and ditches, and thousands of associated appurtenant features
 - 906 mi of maintenance access roads
 - 1,150 ac of flood control basins and associated facilities
 - 3,000 ac of land annexation to SID
- **Management, Enhancement, Habitat Restoration/Construction, Monitoring, and Relocation of Covered Species**
 - 21,800 to 22,800 ac of reserves, preserves, open space lands, and other cooperative habitat restoration/construction areas (e.g., commercial and institutional mitigation banks)

S.2 BACKGROUND

In March 1999, the United States Fish and Wildlife Service (USFWS), in accordance with Section 7 of the Federal Endangered Species Act (FESA) of 1973 (as amended), issued a Biological Opinion regarding the Solano Project Water Service Contract Renewal between the United States Department of the Interior, Bureau of Reclamation (USBR) and the SCWA. The 25-year contract provides for continued delivery of Solano Project water for agricultural, municipal, and industrial purposes throughout the SCWA contract service area (also known as the



Plan Area), the geographic area where Federal water can be delivered by contract. The SCWA delivers Solano Project water in accordance with its eight Member Agency contracts, and the Solano HCP addresses compliance with the terms and conditions of the Solano Project Biological Opinion for the following Member Agencies:

- City of Vacaville
- City of Fairfield
- City of Suisun City
- City of Vallejo
- SID
- MPWD
- University of California, Davis
- California Medical Facility/California State Prison, Vacaville

The USBR, SCWA, and above-listed Member Agencies have agreed to implement conservation measures to ensure the protection of threatened and endangered species and their habitat within the SCWA contract service area by implementation of the conservation measures outlined in the Solano Project Water Service Contract Renewal Biological Opinion. One of the main conservation measures of the Solano Project Biological Opinion is for the SCWA and the Member Agencies to develop an HCP for the Solano Project contract service area.

S.2.1 Purpose

The purpose of the Solano HCP is to: (1) promote the conservation of biological diversity and the preservation of endangered species and their habitats consistent with the recognition of private property rights; (2) provide for a healthy economic environment for the citizens, agriculture, and industries; and (3) allow for the ongoing maintenance and operation of public and private facilities in Solano County.

S.2.2 Planning Process

The development of the Solano HCP has been guided by input from the following: (1) Resource Agencies made up of the California Department of Fish and Wildlife (CDFW), USFWS, and National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA NMFS); (2) the Plan Participants (also known as Participating Agencies); (3) the general public and stakeholder groups (e.g., the Steering Committee); and (4) the Science Advisors.

S.2.3 Plan Area and Covered Activities

The Solano HCP will account for all Covered Activities undertaken by or under the permitting authority and control of the Plan Participants within the approximately 585,000 ac Plan Area, which encompasses approximately 577,000 ac of Solano County and approximately 8,000 ac of Yolo County.



S.2.4 Covered Activity Zones

To adequately address the varying activities undertaken by or under the permitting authority and control of the Plan Participants and the presence of non-participating agencies with land use authority over portions of the Plan Area (i.e., Solano County, Yolo County, and the City of Benicia), the Plan Area has been divided into three implementation zones (Figure 1-4). Different types of activities affecting Covered Species will be authorized within each of these three zones:

- **Zone 1 – Urban Zone:** The urban zone (89,000 ac) encompasses the designated UGBs for each city, including all of the designated land use area and future annexation areas as defined by their General Plans, the County General Plan, and relevant supporting documents within the Plan Participant cities of Dixon, Fairfield (excluding Travis Air Force Base [AFB]), Rio Vista, Suisun City, Vacaville, and Vallejo.
- **Zone 2 – SCWA and the Irrigation and Reclamation District Zone:** Covered Activity Zone 2 (which is approximately 172,000 ac) consists of the lands outside of Covered Activity Zone 1 that are within the boundaries of the SCWA, SID, MPWD, RD 2068, RCD, DRW JPA, FSSD, and VSFCD, and any existing and future flood control channels/facilities maintained by the cities that extend up to 0.5 mi beyond the cities' UGBs. Covered Activities within Zone 2 are primarily related to: ongoing operation and maintenance of irrigation and flood control facilities; construction of new facilities for irrigation district service area inclusions (lands within the irrigation district service area that do not currently receive service); and annexations (lands currently outside of the irrigation district service area that may be included in the future). The portion of the Plan Area located in Yolo County falls within Covered Activity Zone 2. Other Covered Activities within this zone include development-related activities carried out under the authority of the Plan Participants on lands outside of the designated UGBs.
- **Zone 3 – Remainder of the County:** Covered Activity Zone 3 consists of the remainder of Solano County, approximately 324,000 ac. Covered Activities within this zone relate primarily to implementation of the HCP Reserve System, including adaptive management and monitoring, habitat enhancement, habitat restoration and creation, collection of seed for restoration purposes, and other associated compatible activities¹ on designated reserves/preserves, mitigation sites/banks, open space lands, and adjacent lands. Agricultural lands within 0.5 mi of any property acquired as habitat mitigation for the HCP, including institutional and commercial mitigation banks established and certified by SCWA for conservation purposes, have the option of receiving permit coverage as part of the Solano HCP Good Neighbor Policy (see Section 10.5.6).

S.2.5 Covered Activities

The Solano HCP provides a comprehensive Conservation Program for impacts to Covered Species and Natural Communities for designated activities undertaken by or under the permitting authority/control of the Plan Participants within the Plan Area and applicable Covered Activity Zones. Plan Participants may also extend incidental take coverage for Covered Activities conducted by third

¹ Additional details on compatible activities are provided in: Chapter 4.0, Conservation Analysis; Chapter 5.0, Conservation Strategy; Chapter 6.0, Avoidance, Minimization, and Mitigation Measures; and Chapter 7.0, Monitoring and Adaptive Management.



parties who fall under their direct regulatory control. Third-party applicants seeking authorization under the HCP for Covered Activities must complete a participating special entity process (Section 10.4, Authorization of Incidental Take). [Please note that all parenthetical references to chapters or sections refer to chapters or sections of the Solano HCP.]

S.3 BIOLOGICAL RESOURCES

The geography of Solano County, with the Central Valley to the east, a large bay and estuary system to the south and west, and coastal mountain ranges to the west and north, has resulted in a great diversity of native species and habitats. The juxtaposition of numerous geographical and geological provinces within the County lends to its division into four broad Natural Communities: (1) Valley Floor Grassland and Vernal Pool Natural Community; (2) Inner Coast Range Natural Community; (3) Riparian, Stream, and Freshwater Marsh Natural Community; and (4) Coastal Marsh Natural Community. While not technically a Natural Community, agriculture is a dominant cover type, particularly in the northeastern quarter of the County, and provides important habitat for several Covered Species (e.g., Swainson's hawk and burrowing owl). Therefore, agriculture is treated as a fifth Natural Community in the descriptions below.

S.3.1 Natural Communities

S.3.1.1 Valley Floor Grassland and Vernal Pool Natural Community

The Valley Floor Grassland and Vernal Pool Natural Community is located predominantly within the southeastern portion of the Plan Area, but it includes portions of Lagoon Valley, Green Valley, and Suisun Valley. The soil types and weather patterns combine to discourage the extensive growth of trees and shrubs associated with many of the plant communities that exist within the Inner Coast Range Natural Community. Vegetation communities within the Valley Floor Grassland and Vernal Pool Natural Community consist mainly of types such as grasslands that are dominated by herbaceous species.

Grassland is the dominant vegetation type within the Valley Floor Grassland and Vernal Pool Natural Community. While this broad category contains a number of recognized grassland vegetation alliances, for the purposes of the Solano HCP, grasslands in the Valley Floor Grassland and Vernal Pool Natural Community were divided into two primary associations (based on soil types): Valley Floor Grasslands and Vernal Pool System Grasslands.

S.3.1.2 Inner Coast Range Natural Community

The Inner Coast Range Natural Community is located along the western margin of Solano County and includes the Sky Valley and Sulphur Springs Mountain area (Tri-City/County Planning Area), the area west of Green Valley (e.g., West Hills), the volcanic hills of the Rockville area, and the Vaca Mountains/Blue Ridge. This community association is distinguished by geographic location, elevation, and soils. Consisting of ridges and valleys that trend in a northwestern direction, this Natural Community is better characterized as a geographical region based on its shared topography and because it combines a number of plant communities, including grassland, oak woodland, oak savanna, and mixed chaparral/scrub that form a mosaic over the entire Inner Coast Range Natural Community.



S.3.1.3 Riparian, Stream, and Freshwater Marsh Natural Community

The Riparian, Stream, and Freshwater Marsh Natural Community is interwoven through each of the other Natural Communities throughout the Plan Area. The Riparian, Stream, and Freshwater Marsh Natural Community was recognized as unique from the surrounding regional communities based on its association with flowing or pooled freshwater conditions. While many of the plant communities within the other Natural Communities are highly adapted to the dry conditions typical of California, the Riparian, Stream, and Freshwater Marsh Natural Community is adapted to the presence of fresh water in and along streams, rivers, creeks, and marshes.

S.3.1.4 Coastal Marsh Natural Community

Portions of the southern part of the Plan Area consist of low-lying lands that stretch along the edge of San Pablo Bay and Suisun Bay. These low areas are strongly influenced by tidal action, and water depths can vary in some areas from dry to depths of several feet twice a day. This regular fluctuation in water levels distinguished this community type from the Riparian, Stream, and Freshwater Marsh Natural Community described above. The shallow water depths promote the growth of numerous emergent plant species that form communities unique to these tidally influenced shores. The Coastal Marsh Natural Community is recognized because of its geographic location and unique hydrology. Vegetation within this community is entirely herbaceous and consists mainly of saltwater and brackish water marshes.

S.3.1.5 Agricultural Lands

Much of the northeastern portion of Solano County has been converted into intensive agricultural uses. Conversion to agriculture has resulted in a high degree of habitat alteration. Agricultural lands typically support domesticated species of plants that have been raised for harvest purposes (e.g., alfalfa, corn, or tomatoes). When taken out of active production, agricultural lands tend to support ruderal, weedy grasses and forbs that marginalize potential habitat value. The use of these lands by wildlife depends on the vegetation characteristics, cultivation practices, and flooding regimes conducted in these agricultural areas. Within Solano County, agricultural lands can provide important habitat for numerous raptors, including Swainson's hawk and burrowing owl.

S.3.2 Covered Species

Of the 36 species proposed for coverage under the Solano HCP, 24 are currently Federally listed as either Endangered, Threatened, or a Candidate for Listing. There are 17 species that are State-listed as either Rare, Endangered, Threatened, a Candidate Species, or Fully Protected (12 of which are joint Federal/State listed and three are also listed as California Fully Protected Species). There are two plant species listed as State Rare, and four plant species that are classified only as California Rare Plant Rank (CRPR) 1B species by the CDFW². Twelve plant species are classified as CRPR 1B species (eight species are classified as 1B.1 and four as 1B.2). Three animal species are only listed as California Species of Special Concern by the CDFW, including Central Valley Fall/Late Fall-run Chinook salmon Evolutionarily Significant Unit (ESU), Sacramento splittail, and

² All State and Federally listed Covered Plant Species are classified as CRPR 1B species by the CDFW.



burrowing owl. Table S.1 (all tables are provided at the end of this section) lists the 36 Covered Species and provides information on their Natural Community and habitat associations.

S.3.3 Special Management Species

Special Management Species represent those special-status plants and animals that are typically considered under the California Environmental Quality Act (CEQA) to be threatened or endangered. Special Management Species include several plant species considered to be CRPR rare, threatened, or endangered in California by the CDFW, along with several wildlife species listed by the CDFW as Species of Special Concern. To address the conflicting desire for coverage of all special-status species and compliance with regulatory standards, the “Special Management Species” classification was created for the Solano HCP. Species in this category would benefit from the conservation actions provided for Covered Species and undertaken by Plan Participants. However, sufficient information on these Special Management Species’ biology and management is not available to allow the Federal agencies to make the necessary findings under the “No Surprises” Rule (see Section 10.7.3 for additional information). Therefore, these species are not eligible for incidental take coverage under Section 2081 of the Fish and Game Code. The Conservation Program for the Special Management Species is embodied in the Natural Community conservation measures for the Covered Species.

S.4 CONSERVATION ANALYSIS

The purpose of the Conservation Analysis is to assess the status of biological resources within the Plan Area and identify biologically based measures necessary to conserve Covered Species and Special Management Species. These broader conservation requirements assess actions necessary under ideal circumstances to promote not only the continued existence of Covered Species, but also the measures necessary to “recover” Covered Species and Natural Communities within the Plan Area. This Conservation Analysis also provides a basis for evaluating the Solano HCP Conservation Strategy (Chapter 5.0) against the standards for issuance of incidental take permits under FESA and the California Endangered Species Act (CESA). The Conservation Analysis evaluates four broadly defined Natural Communities, encompassing a wide range of habitat types as described above. These Natural Communities are: Valley Floor Grassland and Vernal Pool; Inner Coast Range; Riparian, Stream, and Freshwater Marsh; and Coastal Marsh.

S.5 CONSERVATION STRATEGY

This section outlines the main components of the Solano HCP Conservation Program for achieving the purpose of the Solano HCP: to promote the conservation of biological diversity and the preservation of Covered Species and their habitats within the Plan Area. This section describes the goals and objectives for the Covered Species and their associated Natural Communities and the criteria for the selection and management of the reserves and preserves that will form the Solano HCP Reserve System. Table S.2 lists these goals and objectives described in this section and that are in Chapter 5.0 of the HCP. The goals, objectives, and establishment of the Reserve System provide the measurable biological standards on which the Resource Agencies will measure the overall success of the HCP Conservation Program. The goals, objectives, and development of the Reserve System are primarily implemented through project-specific avoidance, minimization, and



mitigation requirements described in Chapter 6.0 and the Monitoring and Adaptive Management Program described in Chapter 7.0.

Implementation of the Solano HCP goals and objectives results in the establishment of a Reserve System³ that will:

- Preserve and manage 10,500 to 11,500 ac of valley floor grassland and vernal pool habitat that shall include the following elements:
 - Up to 9,900 ac of California tiger salamander upland and movement habitat;
 - An estimated 200 ac of restored and up to 800 to 1,000 ac of preserved vernal pool and associated aquatic habitats for Covered Species; and
 - Up to 3 ac of new California tiger salamander breeding habitat.
- Preserve and manage up to 6,522 ac of agricultural foraging habitat, and up to 1,000 ac of nesting and associated foraging habitat for Swainson's hawks and burrowing owls. In addition, provide for increased long-term nesting opportunities through the establishment of a tree planting program and installation and maintenance of artificial burrow complexes.
- Preserve and manage up to 3,300 ac of upland foraging habitat for the California red-legged frog, Callippe silverspot butterfly, Swainson's hawk, and burrowing owl in the Inner Coast Range.
- Preserve and manage up to 50 ac of riparian and up to 36 ac of freshwater marsh, pond, and seasonal wetland habitat within Priority Watersheds and Drainages.
- Restore and manage up to 75 to 100 ac of coastal salt and/or brackish marsh habitat.
- Restore and manage up to 175 ac of aquatic habitat and approximately 120 ac of associated upland habitat for giant garter snakes.

In addition to establishing a Reserve System, the Solano HCP contributes to broader, regional conservation actions by:

- Providing funding to control invasive species on up to 5,000 to 8,500 ac of coastal marsh, stream, and riparian habitats within the Plan Area; and
- Providing funding to implement measures to control and treat existing urban and agricultural runoff.

S.5.1 Reserve System

The Reserve System is the backbone of the Solano HCP Conservation Program. The extent to which the Reserve System can preserve, support, and maintain viable populations of Covered Species, biological diversity, and ecosystem functions will determine the overall success of the

³ The acreages for the anticipated Reserve System components are based on projected Covered Activities and development described in Chapter 2.0 (Land Use and Covered Activities) at build out over the next 30 years. Reductions or alterations in projected build out could affect the anticipated Reserve System acreages.



HCP. The Conservation Analysis in Chapter 4.0 addresses basic reserve design principles that shall, to the maximum extent practicable, guide development of the Reserve System.

S.6 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

This section outlines the process of identifying conditions that must be met prior to obtaining incidental take coverage for new “projects” and for operation and maintenance activities of existing facilities⁴. These conditions include: (1) mandatory baseline report requirements, (2) avoidance and minimization measures, and (3) mitigation measure requirements. This section describes these requirements in a step-by-step manner following a logical progression of development from pre-project planning through environmental review, project approval, and finally project construction/implementation.

S.6.1 Avoidance and Minimization Measures

Under the FESA incidental take standards, an HCP must (1) *“to the maximum extent practicable, minimize and mitigate the impacts of such taking”* (animals); (2) *“...not jeopardize the continued existence of any species”* (plants and animals); and (3) *“...not appreciably diminish the value of the critical habitat for the survival and recovery of the species”* (critical habitat). Under Section 2081 of the California Fish and Game Code, a mitigation plan must “minimize and fully mitigate the effects of the authorized taking” (plants and animals). The Solano HCP adheres to this hierarchical requirement to first consider avoidance and minimization. When avoidance is not biologically desirable or practicable for a project, impacts shall be mitigated through preservation or restoration of Conservation Areas with high quality habitat; compensatory mitigation measures are specified in Section 6.4 of the Solano HCP.

The Solano HCP Conservation Strategy recognizes that avoidance resulting in the creation of small, isolated patches of habitat is not ecologically defensible or desirable. The development of the Solano HCP has incorporated and evaluated these avoidance considerations into the overall strategy of the Conservation Program. As such, the Solano HCP only requires avoidance where: (1) avoided habitats contribute significantly to the value of adjacent open space lands or reserves; (2) smaller, “specialty” reserves are necessary to protect certain resources such as an entire population of a range-restricted species; (3) adequate conservation of a Covered Species or Special Management Species is not available within the Reserve System; and (4) the habitat is located in a designated Valley Floor Grassland and Vernal Pool High Value Conservation Area (Vernal Pool Conservation Area). In areas where the Solano HCP mandates avoidance, there are specific requirements for project design (which include setbacks and buffer areas) and strict post-construction performance criteria for avoided habitat (see Section 10.5, Development of the Reserve System), including protection and management under a permanent Conservation Easement (see Sections 7.3 and 10.5.2). Table S.3 lists the avoidance and minimization measure requirements for Covered Species and their associated Natural Communities.

⁴ Compliance with the Solano HCP is mandatory for all Covered Activities within a Plan Participants’ regulatory control, except for certain limited exemptions identified in Section 10.4.3.



The avoidance, minimization, and mitigation measures have been coded and are used throughout the HCP for easier understanding of which project phase each measure represents, including the following codes:

- DES for project design, review, and approval avoidance and minimization measures.
- CON for project construction and implementation avoidance and minimization measures.
- MIT for project mitigation measures.

The measure codes throughout the HCP have the shortened version for the Natural Community or Covered Species first (e.g., VPG for Valley Floor Grassland and Vernal Pool Natural Community and RLF for California red-legged frog), then DES, CON, or MIT for project phase, and finally the measure number. In headings in this section and in Chapter 6.0 the measure title is also included after the code, such as VPG DES 1 Habitat Avoidance. In the rest of the HCP most often just the codes and measure numbers are referred to.

S.6.2 Mitigation Requirements

The location of a project establishes a base level of mitigation necessary for receiving project approval and obtaining incidental take coverage. Additional mitigation may be required depending on the specific resources present on and adjacent to the site (Section 6.2, Preapplication and Baseline Surveys and Biological Resources Report). Table S.4 describes the mitigation required for impacts to Covered Species and their associated Natural Communities.

S.7 ADAPTIVE MANAGEMENT

Adaptive management provides a framework for confronting uncertainty in natural resource issues and incorporating new information into ongoing management activities. An adaptive management approach acknowledges that managed resources will always change as a result of human intervention, that surprises are inevitable, and that new uncertainties will emerge. Uncertainties do not paralyze management actions nor are they ignored. Instead, uncertainties are dealt with via an active learning approach.

Although the adaptive management strategy anticipates future modifications to implementing the Conservation Program, the alternative conservation strategies are subject to the same limits as other provisions of the Solano HCP, consistent with the USFWS “No Surprises” policy. That is, mitigation measures and management schemes may be modified or new measures substituted as long as the new measures are of roughly equivalent cost and are consistent with approved take assumptions. Procedures for modifications and amendments to the Section 10(a) permit are described in Section 10.10, Suspension/Revocation.

S.8 MONITORING

Monitoring is mandated under the FESA to demonstrate compliance with the respective incidental take conditions and to provide “feedback” information for adaptive management actions implemented under the HCP. The two main components of monitoring are: compliance monitoring and effectiveness monitoring. Compliance monitoring is verifying that the terms of the HCP,



2081 Incidental Take Permit, and Implementing Agreement (IA) are being carried out. In other words, compliance monitoring tracks the status of HCP implementation, ensuring that planned actions are being properly executed as written in the HCP (Section 10.6, Compliance Monitoring and Reporting). Effectiveness monitoring evaluates the effectiveness of the operating Conservation Program of the HCP and whether the assumptions and predictions made during the development of the HCP hold true. In this HCP, this component of effectiveness monitoring associated with achieving the biological goals and objectives is referred to as Biological Effectiveness Monitoring.

S.9 IMPACT ASSESSMENT

From the analysis of direct and indirect effects, a maximum effect to Covered Species anticipated from the implementation of Covered Activities is identified. Generally, incidental take is expressed as the extent of habitat likely to be destroyed or disturbed as a result of an action. It may also be the number of individual animals or the percentage of occurrence of the local species population that may be taken. The FESA defines “take” as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Federal regulation defines the term “harass” as an intentional or negligent act that creates the likelihood of injuring wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns such as breeding, feeding, or sheltering. Furthermore, Federal regulations define “harm” as an act that either kills or injures a listed species. By definition, “harm” includes habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavior patterns such as breeding, spawning, rearing, migrating, feeding, or sheltering.

The HCP addresses the direct and indirect effects of the Covered Activities on the Covered Species and Natural Communities with respect to the proposed HCP (Chapter 8.0, Impact Assessment). Chapter 8.0 provides details of these direct and indirect effects for different Covered Activity categories, including urban development, irrigation and reclamation district construction and annexation, operation and maintenance activities, and activities on preserves and reserves. Chapter 9.0 provides four Alternatives: (1) No Action, (2) an HCP that just addresses the 17 Federally listed species required to be addressed in the Solano Project’s 1999 Biological Opinion, (3) a potential alternative that would minimize potential impacts to Federally listed animal species and habitat by reducing the footprint of urban development, and (4) an increased conservation alternative with a combined HCP/Natural Community Conservation Plan (NCCP).

S.10 PLAN IMPLEMENTATION

Chapter 10.0 of the HCP addresses implementation of the Solano HCP. Implementation will require Plan Participants to carry out certain actions to administer the HCP. The Plan Participants will also be responsible for ongoing administration, coordination, monitoring, review, and reporting that is essential to the success of the HCP. This section also addresses the assurances provided by the State and Federal governments with respect to Changed and Unforeseen Circumstances and procedures for amending and renewing the incidental take permits.

S.10.1 Governance

The SCWA Board of Directors will serve as the governing board for the oversight of the Solano HCP. The SCWA Board of Directors is composed of the five members of the Solano County Board



of Supervisors, the mayors from all seven cities in Solano County, and a board member from each of the three agricultural irrigation districts in Solano County (SID, MPWD, and RD 2068).

The SCWA staff will assume primary responsibility for coordination with the Resource Agencies and preparation of the annual compliance report based on information provided by each Plan Participant. Section 10.2.2 of the Solano HCP outlines the responsibilities of the SCWA.

City Plan Participants will implement the Solano HCP primarily through their planning departments, and the irrigation and special districts will implement the applicable conservation actions through their executive director or designated representative. Section 10.2.3 of the Solano HCP outlines the responsibilities of the Plan Participants, including submitting compliance data to the SCWA for preparation of the annual compliance report by December 15 of each year.

The SCWA, in consultation with the Plan Participants and Resource Agencies, will be responsible for reviewing and certifying mitigation banks and private land dedications to fulfill conservation requirements under the HCP. The SCWA will maintain a list of approved reserves, conservation areas, and mitigation and conservation banks in compliance with Solano HCP mitigation and conservation requirements. This certification/acceptance process will include review of the ability of the site to fulfill applicable conservation objectives and requirements and to ensure that adequate funding is provided for the management and monitoring of the reserve in perpetuity.

S.10.2 Plan Participant Committee

The SCWA and the other Plan Participants will form an Executive Committee similar to the Applicant Committee formed for preparing the Solano HCP. The Executive Committee will provide input from the individual Plan Participants and keep the Plan Participants informed on the status of the HCP.

S.10.3 HCP Advisory Committee

The SCWA and the other Plan Participants will form an Advisory Committee to provide guidance on the implementation of the Solano HCP. The Advisory Committee will be comprised of representatives from the Plan Participants; the Resource Agencies; and members from the general public representing various environmental, land use, agricultural, and development interests similar to the HCP preparation Steering Committee. The purpose of the Advisory Committee will be to provide input and guidance on the use of in-lieu fees, preparation of grant applications, establishment and approval of reserve/preserve management plans and adequacy of funding, and general interpretation of HCP conservation strategies where the intent or applicability of the measures for a specific project may not be clear. (Note: Interpreting the HCP requirements is the responsibility of the permit holders and the issuing Resource Agency[ies]; however, the agencies and permit holders may use and rely on recommendations from the Advisory Committee.)

S.10.4 HCP Technical Review Committee

The SCWA, Plan Participants, and Resource Agencies (Section 10.2.7, Resource Agencies) will establish a Technical Review Committee that will meet regularly for the purposes of reviewing specific required documents for incidental take coverage under the HCP. The Committee will be



responsible for evaluating complex applications under Section 10.4 (Authorization of Incidental Take) and Section 10.5 (Development of the Reserve System). The Committee will advise applicants, when requested, of all insufficient items, inadequate documentation, or data needs, and will provide recommendations for project modifications needed for compliance with the Solano HCP.

The United States Army Corps of Engineers (Corps), United States Environmental Protection Agency (EPA), and Regional Water Quality Control Boards (RWQCBs) may also be invited to participate in this Technical Review Committee as the Plan Participants desire to integrate Section 401 and Section 404 Clean Water Act compliance with the FESA and 2081 Permit compliance under the HCP program.

S.11 DEVELOPMENT OF THE RESERVE SYSTEM

The Solano HCP is primarily designed to function as a pay-as-you-go system, with conservation actions completed prior to or concurrent with the loss or conversion of habitats and associated incidental take of Covered Species. However, substantial habitat preservation, management, restoration, and enhancement is planned or currently occurring within the region through the establishment of mitigation banks such that a significant portion of the HCP habitat conservation goals and objectives, particularly for vernal pool grassland communities and associated species, are expected to occur well in advance of impacts. Section 6.4, Mitigation Requirements, provides information regarding the ongoing conservation actions with respect to each Natural Community and Covered Species.

S.12 FUNDING

Most regional HCPs emphasize a fee-based system, that is, most reserve acquisition and management are achieved through a base per-acre fee charged for development and other Covered Activities. These fees are then pooled to cover the costs of administration, land or reserve acquisition and management, habitat restoration, long-term monitoring, reporting, and other associated costs.

The Solano HCP has, for the most part, adopted a different approach that requires applicants to obtain mitigation for Covered Activities in accordance with the applicable mitigation requirements identified in Chapter 6.0. Fees are still required; however, these fees address administrative costs associated with monitoring and reporting and implementation of broader, landscape-level or cumulative impact mitigation measures.

Fees for administrative cost reimbursements (excluding the SCWA's general fund commitment), adaptive management and monitoring, contingencies, and fee-based Conservation Programs (Sections 10.9.1 and 11.2.1) will be collected by the individual Plan Participant serving as the Lead Agency for the proposed action. That Lead Agency will retain the applicable portion of the administrative fee due to that agency. The remainder of the funds will be forwarded to the SCWA. As the Lead Agency for implementation of the Solano HCP, the SCWA will manage and distribute the funds to fulfill HCP conservation requirements.



The current recommended base application fee to address these various costs is \$5,925 per developed acre⁵ (in 2016 dollars) (for a breakdown, see Table 11.2, Summary of Implementation Annual and Total Budget and Zone 1 Development Application Fee Calculation). Certain infill projects with limited direct, indirect, or temporary impacts to Covered Species are eligible for exemption from compliance with certain HCP avoidance, minimization, and mitigation requirements (Section 10.4.3, Exemptions).

⁵ For the purposes of the fee calculation, a developed acre will typically be equivalent to the total development project/parcel size and includes all landscaping, general public open space, roads, utility easements, etc. The only lands excluded from the impact fee calculation are lands avoided per Solano HCP requirements and which are established, funded, and managed as reserves per Section 10.5.





Table S.1: Covered Species, Special Management Species, and Natural Community Associations

Natural Community	Covered Species		Special Management Species	
	Primary Species ¹	Secondary Species ²	Primary Species	Secondary Species
Valley Floor Grassland and Vernal Pool	Plants: <ul style="list-style-type: none"> Alkali milk-vetch Bogg's lake hedge-hyssop Colusa grass Contra Costa goldfields Ferris's milk-vetch Legenere San Joaquin Valley Orcutt grass³ Solano grass Vernal pool small scale Invertebrates: <ul style="list-style-type: none"> Conservancy fairy shrimp Delta green ground beetle Vernal pool fairy shrimp Vernal pool tadpole shrimp Amphibians: <ul style="list-style-type: none"> California tiger salamander Birds: <ul style="list-style-type: none"> Burrowing owl Swainson's hawk 	Birds: <ul style="list-style-type: none"> Tricolored blackbird 	Plants: <ul style="list-style-type: none"> Baker's navarretia Bearded popcorn-flower Brittlescale Carquinez goldenbush Dwarf downingia Ferris's goldfields Fragrant fritillary Heartscale Heckard's pepper-grass Hispid bird's-Beak Hogwallow starfish Papoose tarplant Recurved larkspur Saline clover San Joaquin spearscale Valley needlegrass grassland⁴ Invertebrates: <ul style="list-style-type: none"> Midvalley fairy shrimp Ricksecker's water scavenger beetle Birds: <ul style="list-style-type: none"> Grasshopper sparrow Mountain plover 	Birds: <ul style="list-style-type: none"> Loggerhead shrike Northern harrier Short-eared owl Yellow-headed blackbird Reptiles: <ul style="list-style-type: none"> Western pond turtle
Inner Coast Range	Amphibians: <ul style="list-style-type: none"> California red-legged frog Invertebrates: <ul style="list-style-type: none"> Callippe silverspot butterfly 	Birds: <ul style="list-style-type: none"> Burrowing owl Swainson's hawk Tricolored blackbird Invertebrates: <ul style="list-style-type: none"> Valley elderberry longhorn beetle Amphibians: <ul style="list-style-type: none"> California tiger salamander 	Plants: <ul style="list-style-type: none"> Valley needlegrass grassland⁴ 	Amphibians: <ul style="list-style-type: none"> Foothill yellow-legged frog Birds: <ul style="list-style-type: none"> Grasshopper sparrow Loggerhead shrike Yellow-breasted chat Yellow-headed blackbird Reptiles: <ul style="list-style-type: none"> Western pond turtle



Table S.1: Covered Species, Special Management Species, and Natural Community Associations

Natural Community	Covered Species		Special Management Species	
	Primary Species ¹	Secondary Species ²	Primary Species	Secondary Species
Riparian, Stream, and Freshwater Marsh	Birds: <ul style="list-style-type: none"> Tricolored blackbird Fish: <ul style="list-style-type: none"> Central Coast and Central Valley steelhead DPSs Invertebrates: <ul style="list-style-type: none"> Valley elderberry longhorn beetle Reptiles: <ul style="list-style-type: none"> Giant garter snake 	Birds: <ul style="list-style-type: none"> California black rail Swainson's hawk Fish: <ul style="list-style-type: none"> Central Valley fall/late fall-run, Sacramento River winter-run, and Central Valley spring-run Chinook salmon ESUs Sacramento splittail Amphibians: <ul style="list-style-type: none"> California red-legged frog 	Amphibians: <ul style="list-style-type: none"> Foothill yellow-legged frog Birds: <ul style="list-style-type: none"> Modesto song sparrow Yellow-breasted chat Reptiles: <ul style="list-style-type: none"> Western pond turtle Plants: <ul style="list-style-type: none"> Valley needlegrass grassland⁴ 	Birds: <ul style="list-style-type: none"> Loggerhead shrike Yellow-headed blackbird
Coastal Marsh	Birds: <ul style="list-style-type: none"> California black rail California clapper rail⁵ Fish: <ul style="list-style-type: none"> Central Coast and Central Valley steelhead DPSs Delta smelt Longfin smelt North American green sturgeon southern DPS Sacramento River winter-run and Central Valley spring-run Chinook salmon ESUs Sacramento splittail Mammals: <ul style="list-style-type: none"> Salt marsh harvest mouse Plants: <ul style="list-style-type: none"> Mason's lilaeopsis Soft bird's-beak Suisun thistle 	Birds: <ul style="list-style-type: none"> Burrowing owl Swainson's hawk Tricolored blackbird Fish: <ul style="list-style-type: none"> Central Valley fall/late fall-run Chinook salmon ESU 	Birds: <ul style="list-style-type: none"> Northern harrier Salt marsh common yellowthroat San Pablo song sparrow Short-eared owl Suisun song sparrow Mammals: <ul style="list-style-type: none"> Suisun shrew Plants: <ul style="list-style-type: none"> Bearded popcorn-flower Delta mudwort Delta tule pea Hispid bird's-beak Suisun marsh aster Wooly rose-mallow 	Birds: <ul style="list-style-type: none"> Loggerhead shrike Yellow-headed blackbird Reptiles: <ul style="list-style-type: none"> Western pond turtle



Table S.1: Covered Species, Special Management Species, and Natural Community Associations

Natural Community	Covered Species		Special Management Species	
	Primary Species ¹	Secondary Species ²	Primary Species	Secondary Species
Irrigated Agriculture	Birds: <ul style="list-style-type: none"> Burrowing owl Swainson's hawk 	Birds: <ul style="list-style-type: none"> Tricolored blackbird Reptiles: <ul style="list-style-type: none"> Giant garter snake 		Birds: <ul style="list-style-type: none"> Loggerhead shrike Northern harrier Yellow-headed blackbird Reptiles: <ul style="list-style-type: none"> Western pond turtle

¹ **Primary Covered Species:** These Covered Species will primarily benefit from the conservation measures for their respective Natural Community, which is listed in Column 1; therefore, the Natural Community is considered to be their primary Natural Community association.

² **Secondary Covered Species:** These Covered Species will benefit from the conservation measures for their respective Natural Community, which is listed in Column 1; however, the Natural Community is *not* considered to be their primary Natural Community association.

³ Federally threatened species identified in Solano County in 2003; not known to occur in Solano County at time of water contract renewal.

⁴ Valley needlegrass is a specific recognized community type and one of the more common of native grassland in which purple needlegrass (*Stipa pulchra* [*Nassella pulchra*]) is the dominant bunch grass. Blue wild rye (*Elymus glaucus*) is also a common species in patches in the Inner Coast Range, valley floor grassland, and riparian areas in Solano County. The California Natural Diversity Database identifies stands of valley needlegrass grassland in the County as being concentrated in the Jepson Prairie in the area west to the Travis Air Force Base runway and south to Denverton. Generally, researchers define native grasslands as having 10 percent relative cover of native grasses.

⁵ Based on recent genetic work, the former "California" subspecies of clapper rail is now recognized by the American Ornithologists' Union as a separate species: Ridgway's Rail (*Rallus obsoletus*) (Chesser et al. 2014). In this HCP the original name will be used because it is still the only legally recognized name under the Federal Endangered Species Act and California Endangered Species Act.

Abbreviations:

DPS = Distinct Population Segment

ESU = Evolutionarily Significant Unit

HCP = Habitat Conservation Plan

Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
VALLEY FLOOR GRASSLAND AND VERNAL POOL	
Goal VPG 1: Establish and maintain a system of new reserves and existing preserves that enhances essential ecological processes, functions, and values, provides for species movement and dispersal, and provides for Valley Floor Grassland and Vernal Pool ecosystem resiliency.	<p>Objective VPG 1.1: Preserve up to 10,500 to 11,500 ac¹ of valley floor grassland and vernal pool habitat within High Value Vernal Pool Conservation Areas and/or potential preserve and reserve areas identified in Figure 4-8 that provide habitat for Covered Species. More specifically, preserve approximately up to:</p> <ul style="list-style-type: none"> • 380 to 400 ac in Subarea 1B, • 700 to 760 ac in Subarea 1C, • 60 to 80 ac in Subarea 1D, • 170 ac in Subarea 1E, • 120 ac in Subarea 1G, • At least 350 ac in Subarea 1F, and • 8,720 to 9,620 ac in Subarea 1A or other potential vernal pool preserve and reserve areas. <p>Objective VPG 1.2: Preserve or establish corridors linking the vernal pool complexes and reserves between the upper Union Creek/northeastern McCoy Creek watersheds (Subareas 1B, 1C, and 1D) and the Jepson Prairie (Subarea 1A), and between the Jepson Prairie (Subarea 1A) and the Potrero Hills (Subarea 2F) (Figure 4-8). Corridor reserves less than 1 mi in width shall be as long as they are wide, with a minimum width of 1,320 ft.</p> <p>Objective VPG 1.3: Restore a minimum of 1 ac of vernal pool habitats within High and Medium Value Vernal Pool Conservation Areas for every acre of seasonal wetland directly impacted by Covered Activities (1:1 ratio, estimated to be approximately 200 ac of restored vernal pools).</p> <p>Objective VPG 1.4: Reserve Management Plans shall include vegetation management strategies that promote establishment of native grasses and that result in a patchwork of lightly to moderately grazed pastures, with occasional patches of ungrazed or taller vegetation.</p>
Goal VPG 2: Maintain and, where possible through restoration, increase population levels and distribution of vernal pool Covered Species.	<p>Objective VPG 2.1: Preserve 90 percent of the occupied habitat of Contra Costa goldfields within the Plan Area.</p> <p>Objective VPG 2.2: Establish 100 ac of new, self-reproducing Contra Costa goldfield populations² within known or potential habitat areas (Figure 4-5).</p> <p>Objective VPG 2.3: Preserve and/or establish 1 occurrence³ of Ferris's milk-vetch within the Plan Area.</p> <p>Objective VPG 2.4: Preserve and/or establish 8 occurrences of alkali milk-vetch within the Plan Area.</p> <p>Objective VPG 2.5: Preserve and/or establish 1 occurrence of vernal pool smallscale within the Plan Area.</p> <p>Objective VPG 2.6: Preserve and/or establish 2 occurrences of Boggs Lake hedge-hyssop within the Plan Area.</p> <p>Objective VPG 2.7: Preserve and/or establish 3 occurrences of legenere within the Plan Area.</p> <p>Objective VPG 2.8: Preserve and/or establish 1 occurrence of Colusa grass within the Plan Area.</p>





Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
	<p>Objective VPG 2.9: Preserve and/or establish 1 occurrence of San Joaquin Valley Orcutt grass within the Plan Area.</p> <p>Objective VPG 2.10: Establish 1 new occurrence of Solano grass on preserved lands within the Plan Area.</p> <p>Objective VPG 2.11: Preserve 2,500 ac of natural vernal pool grassland encompassing known occurrences of Delta green ground beetles in the Jepson Prairie region of the Plan Area.</p> <p>Objective VPG 2.12: Preserve and/or establish 5 populations⁴ of Conservancy fairy shrimp within the Plan Area.</p> <p>Objective VPG 2.13: Preserve and/or establish 10 populations of vernal pool fairy shrimp within the Plan Area.</p> <p>Objective VPG 2.14: Preserve and/or establish 4 populations of vernal pool tadpole shrimp within the Plan Area.</p> <p>Objective VPG 2.15: Preserve existing and/or restore 9,900 ac of California tiger salamander habitat within the High or Medium Value Vernal Pool Conservation Areas (see Figures 4-8 and 4-26). [Note: This acreage objective may be achieved concurrently with Objective VPG 1.1.] Selected reserves shall meet the following criteria:</p> <ul style="list-style-type: none"> • Each reserve shall contain or serve to connect a minimum of two protected breeding sites⁵ (ponds or pools) located within contiguous uplands with no more than 0.7 mi separating the breeding sites. • New reserves, in combination with existing protected areas, shall provide a minimum of 350 ac of contiguous upland habitat that will allow unobstructed movement between breeding sites and upland burrow sites. Following criteria from the USFWS 2015b Draft Recovery Plan for the Central California tiger salamander Distinct Population Segment for reserves, this upland habitat should contain at least one to two active small mammal burrow entrances per acre. • Priority shall be given to establishing reserves that connect existing reserves or that restore habitat between existing reserves in Vernal Pool Conservation Subareas 1F and 2F (the Potrero Hills/SR-12 region), Vernal Pool Conservation Subarea 1A (the Greater Jepson Prairie region), and Vernal Pool Conservation Subareas 1C and 1D (northeast Fairfield region) (see Objective VPG 1.2). • Preserves shall include measures for restoration of upland mounds, where applicable, in order to provide increased burrowing habitat for fossorial rodents and California tiger salamanders above the shallow, rainy season water table (see Section 10.5.4.1). • Preserves shall include measures to limit access to and control California tiger salamander larval predators such as fish, crayfish, and bullfrogs in suitable breeding habitat. <p>Objective VPG 2.16: Preserve California tiger salamander breeding habitat at a 3:1 (mitigation-to-impact) ratio and create new, suitable California tiger salamander breeding habitat at a 1:1 ratio or 0.35 ac, whichever is greater. New breeding habitat shall be provided at a minimum of 0.35 ac per 350 acres of impacted California tiger salamander upland habitat⁶. All new and preserved breeding habitats shall be within lands acquired for the Solano HCP Reserve System.</p>

Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
CALIFORNIA RED-LEGGED FROG	
Goal RLF 1: Reestablish or increase California red-legged frog populations through preservation and management of interconnected blocks of upland and aquatic habitats that support natural movement patterns, breeding, and metapopulation dynamics within the California Red-Legged Frog Conservation Area and Inner Coast Range Natural Community.	<p>Objective RLF 1.1: Preserve and/or actively manage up to 3,300 ac of upland (preserved at a 3:1 ratio of mitigation-to-impact), riparian, and aquatic habitats within the California Red-Legged Frog Conservation Area in perpetuity for the benefit of California red-legged frogs.</p> <p>Objective RLF 1.2: Preserve existing California red-legged frog breeding habitat at a 2:1 (mitigation-to-impact) ratio and create new breeding habitat at a 2:1 ratio in approved reserves within the California Red-Legged Frog Conservation Area for unavoidable direct effects to suitable breeding habitat from Covered Activities.</p> <p>Objective RLF 1.3: Reserve Management Plans shall include vegetation management strategies that promote the establishment of native grasses and that result in a patchwork of lightly to moderately grazed pastures with occasional patches of ungrazed or taller vegetation.</p> <p>Objective RLF 1.4: Maintain connectivity between existing habitat areas and translocate frogs between the three disjunct blocks of the California Red-Legged Frog Conservation Area at least once every 10 years during the effective time frame of the HCP.</p> <p>Objective RLF 1.5: Prohibit activities that would increase or create new aquatic habitat for introduced predators and competitors of California red-legged frogs and other native amphibians (e.g., bullfrog, crayfish, and warm water fish) within the entire Inner Coast Range Natural Community, with an emphasis in the California Red-Legged Frog Conservation Area.</p>
CALLIPPE SILVERSPOT BUTTERFLY	
Goal CSB 1: Maintain or increase Callippe silverspot butterfly populations through preservation and management of interconnected blocks of upland habitat that support natural movement patterns, breeding, and metapopulation dynamics within the Callippe Silverspot Butterfly Conservation Area.	<p>Objective CSB 1.1: Preserve and manage suitable Callippe silverspot butterfly breeding habitat at a 3:1 (mitigation-to-impact) ratio for direct unavoidable impacts to suitable breeding habitat and a minimum of a 1.5:1 ratio for indirect impacts to suitable breeding habitat. Breeding habitat preservation and management shall be accomplished in combination with the 3,300 ac of Inner Coast Range habitats to be preserved and managed under Objective RLF 1.1 (Section 5.4.1).</p> <p>Objective CSB 1.2: Increase the quantity and quality of breeding habitat and adult nectar sources for Callippe silverspot butterfly at a minimum 3:1 ratio for direct and indirect impacts within the Callippe Silverspot Butterfly Conservation Area.</p> <p>Objective CSB 1.3: Reserve Management Plans shall include vegetation management strategies that promote establishment of native grasses and low residual cover of introduced annual grasses (700 to 1,000 lbs or less residual dry matter) in core breeding areas.</p> <p>Objective CSB 1.4: Maintain connectivity between core breeding sites and existing subpopulations within the Callippe Silverspot Butterfly Conservation Area by preserving corridors with a minimum width of 300 ft oriented along hilltops and ridgelines.</p>





Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
RIPARIAN, STREAM, AND FRESHWATER MARSH	
Goal RSM 1: Provide for no net loss of natural hydrogeomorphic processes; essential ecological processes, functions, and values; species diversity; and habitat heterogeneity of riparian, stream, and freshwater marsh habitats within the Plan Area.	<p>Objective RSM 1.1: Preserve, restore, and enhance 50 ac of riparian and 36 ac of freshwater marsh, pond, and seasonal wetland habitat within Priority Watersheds and Drainages.</p> <p>Objective RSM 1.2: Plan Participants shall develop, adopt, and implement invasive species control programs as part of ongoing operational and maintenance activities associated with public facilities (e.g., maintained stream channels, flood control channels, parks, bike paths, and linear parks). Invasive species control programs are subject to review and approval by SCWA in consultation with the Resource Agencies and shall be in place within 5 years of adopting the Solano HCP.</p> <p>Objective RSM 1.3: Restore and expand riparian and floodplain habitat within at least 2.5 mi of existing channelized stream and flood channels of old Alamo Creek, old Ulati Creek, upper Union Creek, other streams identified for restoration efforts, and future development along Priority Drainages (Figure 4-10). Channel design standards shall include, but not be limited to, establishing a two-stage floodplain corridor that allows natural channel meander patterns to develop while still providing for riparian habitat restoration and protection, and an adequate capacity to handle predicted storm flows.</p> <p>Objective RSM 1.4: Maintain peak flows from storm water discharge and natural hydrological processes in order to protect stream channels from degradation through the implementation of storm water management practices.</p> <p>Objective RSM 1.5: Maintain and increase water quality for Covered Species inhabiting receiving waters within and downstream of the Plan Area by minimizing non-point source pollution derived from storm water runoff.</p>
Goal RSM 2: Contribute to the recovery of Covered Species associated with the Riparian, Stream, and Freshwater Marsh Natural Community in the Plan Area through the preservation and expansion of existing populations, and future population expansion and recolonization in restored areas.	<p>Objective RSM 2.1: Remove existing in-stream barriers, to the maximum extent practicable, in Plan Participant rights-of-way and on participating private lands along important steelhead and Chinook salmon streams: Jameson Canyon, Lynch Canyon (a.k.a. American Canyon), Ledgewood, Suisun, Green Valley, and Gordon Valley creeks and their tributaries that contain suitable spawning and rearing habitat for steelhead and Chinook salmon. This will be implemented in conjunction with Objective CM 1.1.</p> <p>Objective RSM 2.2: Prevent the creation of in-stream barriers associated with new development and increase suitable breeding and rearing habitat for steelhead and Chinook salmon along Jameson Canyon, Lynch Canyon, Ledgewood, Suisun, Green Valley, and Gordon Valley creeks and their tributaries.</p> <p>Objective RSM 2.3: Increase available habitat for the valley elderberry longhorn beetle within the riparian areas of Alamo, Ulati, Green Valley, Suisun, Ledgewood, and Putah creeks and other creeks supporting extant valley elderberry longhorn beetle populations by replacing impacted elderberry plants and stems 1 inch in diameter or greater at a minimum ratio of 2:1 (mitigation-to-impact).</p> <p>Objective RSM 2.4: Establish at least 70 ac of new, suitable nesting habitat⁷ for tricolored blackbirds in agricultural reserves established as Swainson's hawk foraging and nesting habitat mitigation.</p>

Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
GIANT GARTER SNAKE	
Goal GGS 1: Promote actions to reestablish or expand giant garter snake populations and habitat in the Plan Area and contribute to their recovery through protection, management, restoration, and enhancement of suitable habitat within the Yolo Basin-Liberty Farms population area.	Objective GGS 1.1: Increase the quality of Delta waterways and tributaries in the Plan Area by implementing programs to control invasive exotic plants and animals and improve water quality. A portion of the Covered Activity impact fees (Section 11.1.2) will be used to implement water quality improvement measures associated with discharges from municipal and agricultural sources and invasive species control measures in sloughs and creeks draining into the Delta Region of the Plan Area. This objective shall be implemented in conjunction with Objective CM 1.1.
	Objective GGS 1.2: Acquire, enhance, and manage 85 ac of aquatic and 22 ac of associated upland habitat for giant garter snake within the Giant Garter Snake Conservation Area as mitigation for unavoidable impacts from routine operational and maintenance activities.
	Objective GGS 1.3: Acquire, enhance, and manage up to 90 ac of aquatic and 95 ac of associated upland habitat for giant garter snake within the Giant Garter Snake Conservation Area as mitigation for potential impacts from development.
COASTAL MARSH	
Goal CM 1: Contribute to enhancing essential ecological processes, functions, and values; species diversity; and habitat heterogeneity of coastal marsh habitat within the Plan Area.	Objective CM 1.1: Increase the quality of coastal marsh habitat in the Plan Area by implementing programs to control invasive exotic plants and animals, improve water quality, and promote fish habitat. This will be implemented through a fee program where funds will be used to implement invasive species control programs and to fund cost-sharing of water quality improvement measures for municipal and agricultural water discharges. Funding resources for these programs will be distributed between the Sacramento River/Delta and San Francisco Bay Drainage Provinces (Figure 3-4) based on the ratio of development occurring within each watershed. Fees collected for development activities within the watersheds of Jameson Canyon, Lynch Canyon, Ledgewood, Suisun, Green Valley, and Gordon Valley creeks, the Napa River, and their tributaries will be directed toward removing existing in-stream barriers and improving habitat and water quality conditions for salmonids.
	Objective CM 1.2: Plan Participants shall prevent increases over baseline conditions (at the time of HCP Adoption) in dry season (May 1 through October 15) discharge from storm water systems into tributaries that drain into Suisun Marsh, Southampton Marsh, and the marshes bordering the Napa River and San Pablo Bay.
Goal CM 2: Plan Participants shall maintain and, where possible, increase population levels and distribution of coastal marsh Covered Species in order to contribute to their recovery.	Objective CM 2.1: Preserve, manage, and restore up to 80 ac of coastal brackish marsh habitats (preserving habitat at a ratio of 3:1 preservation to impacts). Restored marsh habitats shall include a matrix of mid- to high-elevation tidal marsh interspersed with tidal channels targeted to provide habitat for California black rail, California clapper rail, salt marsh harvest mouse, delta smelt, and Mason's lilaeopsis.
	Objective CM 2.2: Plan Participants shall restore and manage 175 ac of shallow water aquatic habitat suitable for delta smelt and Sacramento splittail in the lower Delta area of Solano County. This objective shall be implemented in conjunction with Objective GGS 1.2 for the giant garter snake.
	Objective CM 2.3: Plan Participants shall establish at least 1 new self-reproducing occurrence of Suisun thistle and soft bird's-beak.
	Objective CM 2.4: Contribute to increasing food production and habitat quality for delta smelt, Sacramento splittail, longfin smelt, and green sturgeon through restoration of tidal marsh habitat (Objectives CM 2.1 and 2.2) and improvements to water quality discharge from urban and agricultural sources (Objective CM 1.1).





Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
SWAINSON'S HAWK	
Goal SH 1: Contribute to the maintenance of the existing population of Swainson's hawk (estimated to be between 120 and 130 pairs) by preserving up to 20,322 ac of habitat in Swainson's Hawk Potential Reserve Areas.	<p>Objective SH 1.1: Preserve and manage in perpetuity up to 6,522 ac of agricultural foraging habitat in the Swainson's Hawk Irrigated Agriculture Potential Reserve Area. Approximately 25 percent of the reserves will be established in Subarea A (the area north of I-80), approximately 20 percent of the reserves will be established in Subarea B (the area west of SR-113), and approximately 55 percent of the reserves will be established in Subarea C (the area east of SR-113) (Figure 4-27).</p> <p>Objective SH 1.2: Manage reserves established for Swainson's hawk mitigation within the Irrigated Agriculture Potential Reserve Area (Figure 4-27) to achieve the following:</p> <ol style="list-style-type: none"> 1. At least 50 percent of cultivated lands in the Reserve System, measured on a system-wide basis, shall be planted and managed in any given year for alfalfa or other irrigated crops with similar structural characteristics, prey availability and abundance, and management requirements (e.g., regular irrigation and harvesting throughout the Swainson's hawk nesting season). The remaining 50 percent of cultivated lands may be planted in any annual or biennial crop type that provides suitable foraging habitat for Swainson's hawk and is an acceptable rotation crop typical of or suitable for alfalfa production in this region (see Figure 5-1). 2. Five percent of the Irrigated Agriculture Reserve System, measured on a system-wide basis, shall be set aside and established in permanent, naturalized herbaceous and woody/shrub cover. The locations of these areas shall be determined on a reserve-specific basis to maximize distribution throughout the reserve, minimize interference to agricultural operations, and make best use of the naturalized vegetation areas to provide habitat for a variety of Covered Species and Special Management Species in addition to Swainson's hawk. These areas may be used for preserving or planting nest trees (Objective SH 2.1); establishing burrowing owl artificial nest burrows⁸ (Objectives BO 1.1, BO 2.2, and BO 2.3), tricolored blackbird nesting habitat (Objective RSM 2.4), nesting habitat for other Special Management Species (Section 5.11); and providing vegetated filter strips for water quality enhancement (see Figure 5-1 for a reserve design example). <p>Objective SH 1.3: Preserve and manage an estimated 10,500 to 11,500 ac of valley floor grassland and vernal pool habitat to promote Swainson's hawk foraging and nesting opportunities within the Swainson's Hawk Valley Floor Grassland and Vernal Pool Potential Reserve Area. This measure may be addressed concurrently with Objective VPG 1.1 in Section 5.3.1.</p> <p>Objective SH 1.4: Preserve and manage up to 3,300 ac of grassland and oak savanna habitat to promote Swainson's hawk foraging and nesting opportunities within the Inner Coast Range Potential Reserve Area.</p>
Goal SH 2: Provide sufficient nesting habitat in proximity to suitable foraging habitat to support the current Swainson's hawk population within the Plan Area.	<p>Objective SH 2.1: Provide a minimum average density of suitable nest tree or grove of trees⁹ in perpetuity at the following densities within each Natural Community Reserve Type:</p> <ul style="list-style-type: none"> • One suitable nest tree or grove of trees per 40 ac of reserve (minimum of 143 trees/groves) in perpetuity in the Swainson's Hawk Irrigated Agriculture Potential Reserve Area. • One suitable nest tree/grove per 320 ac of reserve (estimated to be 32 to 36 trees/groves) in the Valley Floor Grassland and Vernal Pool Potential Reserve Area by preserving and replacing suitable nest trees within current and historical homesteads and restoring riparian habitats. • Ten suitable nest trees/groves per 320 ac of reserve (estimated to be three trees/groves) in the Inner Coast Range Potential Reserve Area.

Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
	<p>Objective SH 2.2: Preserve and manage one active Swainson's hawk nest for each known Swainson's hawk nest affected by Covered Activities. SCWA, in consultation with the Resource Agencies (see Section 10.2.7), will implement interim measures to protect active and known Swainson's hawk nest sites until such time as the Reserve System supports a number of nests equal to or greater than the number of nests lost for both species as a result of HCP Covered Activities. The Nest Protection Program consists of two actions:</p> <ol style="list-style-type: none"> 1. SCWA will preserve 1,000 ac encompassing active and known nest sites and associated foraging habitat for Swainson's hawk in perpetuity. The location of the preserved nesting habitat will be based on land availability and long-term suitability of nesting habitat as determined by SCWA and the Resource Agencies. Lands will be preserved through direct acquisition and/or conservation easements from public and private landowners. 2. SCWA, in consultation with the Resource Agencies, will implement an interim program to protect active nest sites. SCWA will identify acceptable active nest sites and then work with landowners to establish defined term contracts or agreements (3 to 5 years) to protect and manage the nest sites. Contracts or agreements to preserve known nest trees will remain in place until: (1) the term of the contract expires; (2) the tree dies of natural causes and becomes a hazard to people or property; or (3) the tree is abandoned by nesting Swainson's hawks for at least 3 consecutive years. Upon termination of a defined term contract to protect a known nest tree, another contract shall be obtained. Nest impact assessment funds (see Section 11.1.2) may also be used to purchase "established nest" credits at HCP-certified mitigation banks or acquire and manage occupied nesting habitat per action 1, above.
BURROWING OWL	
Goal BO 1: Preserve and manage suitable foraging in order to mitigate for lost foraging habitat in the Plan Area.	<p>Objective BO 1.1: Preserve and manage in perpetuity up to 6,522 ac of agricultural lands and annual grassland within the Swainson's Hawk Irrigated Agriculture Potential Reserve Area. In order to promote foraging and nesting opportunities for burrowing owl, a minimum of 140 ac of grassland habitat within the Swainson's Hawk Irrigated Agriculture Reserve System (target 2 percent per reserve) shall be established to provide nesting opportunities and suitable cover for burrowing owls. This objective will be implemented concurrently with Objective SH 1.1.</p> <p>Objective BO 1.2: Preserve and manage up to 10,500 to 11,500 ac of valley floor grassland habitat to promote foraging and nesting opportunities within the Swainson's Hawk Valley Floor Grassland and Vernal Pool Potential Reserve Area. This objective will be implemented concurrently with Objective VPG 1.1.</p> <p>Objective BO 1.3: Preserve and manage up to 3,300 ac of foraging habitat to promote burrowing owl habitat within the Inner Coast Range Potential Reserve Area. This objective will be implemented concurrently with Objective RLF 1.1.</p>
Goal BO 2: Preserve the existing nesting areas outside the developed urban areas and promote the expansion of nesting habitat/burrows in the grassland and agricultural regions of the Plan Area.	<p>Objective BO 2.1: Preserve and manage one active burrowing owl nest for each known burrowing owl nest affected by Covered Activities. This will be accomplished through the two-stage process described under Objective SH 2.2, through targeted acquisition and/or conservation easements of known active nesting habitat, and through defined term contracts or agreements.</p> <p>Objective BO 2.2: Install, monitor, and maintain at least 70 burrow complexes (minimum three burrows per complex) within the 140 ac of unplanted grassland preserved in the Swainson's Hawk Irrigated Agriculture Reserve System (Objective SH 1.2) to provide suitable burrowing owl nesting habitat¹⁰. For each burrow complex installed, at least five additional burrows within 250 ft of the nest burrow complex will also be installed and maintained for use as escape burrows by owlets. These burrowing owl habitat reserve areas shall also be provided on a system-wide basis under the following additional criteria:</p>





Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
	<ol style="list-style-type: none"> Suitable Burrow and Cover Habitat: At least 2 ac¹¹ of reserve land shall be permanently taken out of production to provide suitable nesting habitat and cover for burrowing owls on each 80 ac reserve that is used for burrowing owl mitigation. These 2 ac shall consist of one continuous block of habitat and shall not be located adjacent to a County road, highway, or within 650 ft of Swainson's hawk nesting trees (see Figure 5-1 for an example). Artificial Burrows: At least two burrow complexes (three burrows per complex) shall be installed and maintained in perpetuity where natural burrows do not occur in sufficient density within the 2 ac of habitat set aside for burrowing owls. Artificial burrows will be monitored annually for effectiveness. Biological monitors will report on the colonization of the nest burrows by owls and the number of owls fledged per nest. Vegetation Height: Within the 2 ac of habitat set aside for burrowing owls, management measures shall be implemented and adequately funded to maintain an average effective vegetation height less than or equal to 6 inches from February 1 to April 15, when owls typically select mates and nest burrows (see Section 10.5.3.2). In addition, the 2 ac of habitat must be kept free of tree and shrub canopy cover in perpetuity. <p>Objective BO 2.3: Provide 28 suitable burrows per 280 ac of valley floor grassland and vernal pool preserves by expanding ground squirrel populations in grassland reserves and, if necessary, installing and maintaining artificial burrows where natural burrows do not occur in sufficient density. Reserves established for burrowing owls shall be at least 80 ac in size, provide suitable foraging habitat, and meet the basic reserve management standards identified in Sections 7.3 and 10.5.3 and the following additional management requirements:</p> <ol style="list-style-type: none"> Vegetation Height: Management measures shall be implemented and adequately funded to maintain an average effective vegetation height¹² less than or equal to 6 inches over 80 percent of the reserve. This average effective vegetation height shall be sustained from February 1 to April 15, when owls typically select mates and nest burrows. To achieve this standard, the average effective height of residual vegetation on February 1 each year shall not exceed 4 inches. In addition, no more than 20 percent of the reserve may support tree and shrub canopy or tall dense grass cover. Restrictions on Rodent Control: Reserves in grassland habitats shall allow ground squirrel control only within existing irrigation canals/drain easements. Ground squirrel control on the perimeter of the reserves will be accomplished on adjacent properties, not on the reserve itself (see Sections 7.3 and 10.5.3). Burrow Density: Valley Floor Grassland Reserves shall provide at least 28 suitable burrows per 280 ac of Valley Floor Grassland and Vernal Pool Preserves. Where natural burrows do not occur in sufficient density, at least three artificial burrow complexes per 280 ac of reserves shall be installed, monitored, and maintained until sufficient burrow density is achieved. Artificial burrow complexes shall be provided at a rate of three multi-entrance nest burrow/chambers and nine temporary burrows per 280 ac of reserves until suitable, natural burrow densities reach a minimum of 28 burrows per 280 ac. <p>Objective BO 2.4: Provide 28 suitable burrows per 280 ac of reserves established within the Inner Coast Range Potential Reserve Area. Reserves for burrowing owls shall be at least 80 ac in size, provide suitable foraging habitat, and meet the basic reserve management standards identified in Objective BO 2.3 and Section 10.5.3.</p> <p>Objective BO 2.5: Provide suitable burrowing owl burrows and manage foraging habitat in proximity to impacted habitat when burrowing or foraging habitat is subject to temporary impacts (refer to Chapter 12.0 Glossary for definition). Where natural burrows do not occur in sufficient density, artificial burrows shall be provided.</p>

Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
1	Habitat preservation and restoration objectives are based on projected habitat losses described in Chapter 2.0 at build out and the specific mitigation requirements for Covered Species and Natural Communities described in Section 6.4.
2	Self-reproducing population is defined as having plants that reestablish annually for a minimum of 5 years with no human intervention such as supplemental seeding.
3	One occurrence corresponds to an occupied area at least 0.25 mi away from the next occupied area (USFWS 2006). The number of plants making up an occurrence may vary from year to year particularly as annual plant germination and growth may be affected by environmental conditions in a given year. An occurrence must be self-sustaining; therefore, a single Contra Costa goldfield plant would not likely be considered an occurrence. If, however, a small number of plants is repeatedly observed at a location over time, this location could be considered an occurrence provided it is separated from other occurrences by at least 0.25 mi.
4	Population is defined in the Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon (USFWS 2005b) as “a group of individuals of the same species that occupy an area small enough to permit interbreeding regularly.”
5	Acceptable breeding sites suitable for meeting this criterion shall have demonstrated an ability for successful recruitment and have suitable hydrology to be capable of successful recruitment during low to normal rainfall years.
6	Trenham and Shaffer data (draft manuscript 2003) showed ponds of 0.14 hectare (equivalent to 0.35 ac) as being the minimum size necessary to maintain a viable salamander population. The addition of breeding habitat at a ratio of 0.001 ac per acre of impacted upland habitat in combination with upland habitat mitigation requirements (see Section 6.4.2.2) is designed to achieve the minimum amount of breeding habitat for 350 ac of preserved upland habitat as part of the California tiger salamander Conservation Program.
7	Nesting habitat established to meet this objective shall not consist of nonnative invasive weed species.
8	Artificial nest burrows for burrowing owls will be located at least 650 ft (0.12 mi) from existing or planted Swainson’s hawk nest trees.
9	Nest tree sites ideally will include a small grove or row of native trees, with fewer than 10 individuals per site. Each grove should include several species and age groups of mature and young replacement trees. This objective shall be achieved at each reserve.
10	Not every reserve will have burrowing owl artificial nest burrows established within the unplanted areas, but the Reserve System will have the equivalent of one burrow complex installed for every 80 ac reserve established.
11	This preservation requirement equates to approximately 50 percent of the unplanted areas required in agricultural reserves (5 percent of reserves left unplanted = 285 ac, half of which is approximately 140 ac); the other 50 percent (approximately 140 ac) can be used for tree plantings, taller grass, or shrub cover (e.g., nesting habitat for tricolored blackbird and northern harrier).
12	Effective vegetation height is the height at which 90 percent of a white board is obscured by vegetation when viewed 3 ft from the ground at a distance of 33 ft (Green and Anthony 1989).

Abbreviations:

ac = acres

ft = feet

HCP = Habitat Conservation Plan

I-80 = Interstate 80

lbs = pounds

mi = miles

SCWA = Solano County Water Agency

SR-12 = State Route 12

SR-113 = State Route 113

USFWS = United States Fish and Wildlife Service





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
VALLEY FLOOR GRASSLAND AND VERNAL POOL	
VPG DES 1: Habitat Avoidance	<p>In Covered Activity Zones 2 and 3 (Figure 1-4), maximum avoidance of vernal pools and other seasonal wetlands is required in all locations except for approved habitat enhancement/restoration activities (see Section 10.5.4). In Covered Activity Zone 1, maximum avoidance is required in the following locations¹ where:</p> <ol style="list-style-type: none"> 1. The wetlands contribute to the habitat quality and value of reserve/preserve lands established (or expected to be established) in perpetuity for conservation purposes; 2. The wetlands are adjacent to or contiguous with riparian or stream corridors, or other permanently protected lands; or 3. The wetlands are located in or contiguous to High Value Vernal Pool Conservation Areas. <p>Where temporary or permanent fill is proposed in any vernal pools or other seasonal wetlands in Covered Activity Zones 2 and 3, and in the above-listed locations in Covered Activity Zone 1, the Plan Participant (or eligible third-party applicant) shall provide documentation explaining why avoidance is not practicable and/or would not contribute to the conservation goals and objectives of the HCP, in accordance with the procedures in Section 10.4.1. The determination of compliance with Avoidance and Minimization Measure VPG DES 1 of any proposed Covered Activity that would result in the filling of vernal pools or other seasonal wetlands will be made by SCWA in consultation with the HCP Technical Review Committee (see Sections 10.4.1 and 10.2.6).</p>
VPG DES 2: Site Design Standards	<p>The following site design standards shall apply to all Covered Development Activities that would affect Valley Floor Grassland and Vernal Pools:</p> <ol style="list-style-type: none"> 1. All Locations Specified Under Avoidance and Minimization Measure VPG DES 1 <ol style="list-style-type: none"> a. All avoided areas shall be preserved and managed consistent with the requirements in Sections 7.3 and 10.5. These areas shall also include sufficient buffers in compliance with the criteria outlined in Avoidance and Minimization Measures VPG DES 3 and VPG DES 4. b. Development shall be designed to minimize direct and indirect impacts to wetlands and edge effects to preserved areas. c. The applicant shall incorporate measures into the project design to accomplish the following: <ol style="list-style-type: none"> 1) Preserve and maintain sufficient unaltered watershed area to prevent significant adverse changes in water quality, and the volume and timing of inflows to preserved wetlands. 2) Avoid changes in nutrient input from adjacent upland sources into preserved wetlands. 3) Provide sufficient upland habitat to support associated amphibian and terrestrial fauna and vernal pool plant pollinator species. 4) Accommodate linkages/corridors between individual aggregations of vernal pools in a larger vernal pool complex.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>5) Provide a terrestrial buffer to protect the core wetland and associated upland habitat from edge effects associated with surrounding land uses (i.e., prohibit backyards from backing up to preserves, place firebreaks on the development side of preserve/development boundaries, provide for a vegetated buffer between roads and preserve boundaries).</p> <p>6) Minimize the potential for spread of invasive species from the development into preserved lands.</p> <p>d. Development shall not isolate existing populations or suitable habitat areas. To maintain connectivity between adjacent reserves, a corridor shall be established linking these areas. Corridor reserves shall conform to the minimum requirements specified in Avoidance and Minimization Measure VPG DES 6, Corridors.</p> <p>2. Contra Costa Goldfield Core Population Areas (High Value Vernal Pool Conservation Subareas 1B, 1C, 1D, 1E, 1F, 1G, and 1H)</p> <p>a. No more than 10 percent of suitable wetland habitat for Contra Costa goldfields² shall be directly impacted per project.</p> <p>b. The 10 percent of suitable habitat impacted under Condition 1 shall not contain more than 50 percent of the current or historically documented occupied habitat on the site. The extent of occupied habitat shall be determined based on at least 2 years of field surveys/mapping at the site³ (occupied habitat area shall be based on the total area of the hydrologically contiguous occupied wetland, not just Contra Costa goldfield cover).</p> <p>c. Implementation of Conditions 1 and 2 shall not result in preserves less than 80 contiguous acres in size.</p>
VPG DES 3: Buffer Criteria for Covered Development Activities	<p>Vegetated buffers shall be established around preserved vernal pools and seasonal wetlands. Buffers shall be consistent with the following criteria:</p> <p>1. Vegetated buffers shall consist of valley floor grassland and vernal pool vegetation and/or other natural vegetation (i.e., oak savanna/woodland, coastal marsh or riparian habitats, if applicable).</p> <p>2. Buffers shall not contain any irrigated or landscaped lands, firebreaks, or public or maintenance access trails or roads.</p> <p>3. Habitats (vernal pools, uplands, etc.) within 250 ft of development in High and Medium Value Vernal Pool Conservation Areas and 100 ft in Low Value Vernal Pool Conservation Areas (Figure 4-8) (see potential exceptions below under Avoidance and Minimization Measure VPG DES 4 for Extremely Rare and/or Range-Limited Species) will be considered to be indirectly impacted. All such indirect impacts shall be subject to the mitigation requirements under Section 6.4.2.</p> <p>4. Buffers shall be preserved in perpetuity and managed consistent with the reserve criteria described in Sections 7.3 and 10.5.</p>
VPG DES 4: Protection and Buffer Zones for Extremely Rare and/or Range-Limited Species	<p>Populations of the following Covered Species that occur in vernal pools shall be protected in perpetuity if they are found on a site where a Covered Development Activity is proposed: Colusa grass, Solano grass, San Joaquin Valley Orcutt grass, Ferris's milk-vetch, and Conservancy fairy shrimp. All development projects shall include site-specific buffer zones that encompass, at a minimum, the immediate watershed for the occupied vernal pools and a 500 ft buffer beyond the watershed boundary. Applicants shall prepare and implement management plans and provide sufficient endowments</p>



**Table S.3: Avoidance and Minimization Measures**

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	for long-term management of these areas consistent with the reserve management and approval requirements described in Sections 7.3 and 10.5.3.
VPG DES 5: Design Measures for New Roads	<p>New roads or expanded existing roads meeting the following criterion shall include measures to accommodate movement by California tiger salamanders and other small animals, and to maintain hydrological connectivity for vernal pool crustacean Covered Species, vernal pool plant species, and their propagules (e.g., seeds, cysts):</p> <ol style="list-style-type: none"> 1. The new or expanded road is in a High Value Vernal Pool Conservation Area or bisects a designated corridor (Figure 4-2) that has a design traffic volume of 20 cars per hour or greater at maximum capacity. <p>The design measures may include culverts, underpasses, and roadside barriers to prevent animals from accessing the roads. Crossings shall be provided in areas where concentrated movement is likely (i.e., along swales, significant slope breaks, near wetlands, and breeding sites). Plan Participants (and eligible third-party applicants) proposing road activities that meet the above criteria shall provide project plans to SCWA showing the specific crossing design measures and an analysis of how the design measures will accommodate crossing by the applicable Covered and Special Management Species. The project plans and analysis will be subject to the review and approval of SCWA in consultation with the HCP Technical Review Committee (see Section 10.2.6).</p>
VPG DES 6: Corridors	<p>Projects in the following areas shall preserve and/or establish corridors linking the vernal pool complexes and reserves:</p> <ol style="list-style-type: none"> 1. The upper Union Creek/northeastern McCoy Creek watersheds (Subareas 1B, 1C, and 1D) and the Jepson Prairie (Subarea 1A). 2. The Jepson Prairie (Subarea 1A) and the Potrero Hills (Subareas 1F and 2F) (Figure 4-8). <p>Corridors shall have the following minimum dimensions:</p> <ol style="list-style-type: none"> 1. Corridors 500 ft or less in length shall have a minimum width of 500 ft. 2. Corridors more than 500 ft in length but less than 1,320 ft in length shall have minimum dimensions of 1:1 (i.e., a 700 ft long corridor shall be 700 ft in length). 3. Corridors 1,320 ft or longer shall have a minimum width of 1,320 ft. <p>All corridors shall be protected and maintained under a permanent Conservation Easement as required under Sections 7.3 and 10.5.2.</p>
VPG CON 7: Best Management Practices to be Implemented During all Operation, Maintenance, and Construction Activities in and Adjacent to Preserved and Avoided Habitats	<ol style="list-style-type: none"> 1. Biological Monitor <ol style="list-style-type: none"> a. An Approved Biologist shall monitor all ground-disturbing activities within 100 ft of preserved habitats (or as otherwise specified for species-specific avoidance requirements) to ensure that no unnecessary take of listed species or destruction of their habitat occurs. The biologist shall have the authority to stop all activities that may result in such take or destruction until appropriate corrective measures have been completed. The biologist shall immediately notify SCWA of any unauthorized impacts; SCWA shall report to the USFWS and CDFW within 24 hours of notification.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>b. The biological monitor shall provide instructions to all on-site construction personnel regarding the presence of listed species, the measures required by law to avoid impacts to vernal pool species and their habitat, and the possible penalties for not complying with these requirements.</p> <p>2. Habitat Protection During Work Activities</p> <p>a. Vernal pool habitat and adjacent grassland/upland areas within the immediate work areas shall be identified and marked in the field prior to staging and construction/ground-disturbing activities.</p> <p>b. Exclusion fencing shall be installed prior to any required preconstruction surveys and maintained between project work areas and adjacent preserved habitat during all work activities. Exclusion fencing will consist of silt fabric, plywood, aluminum, or other SCWA-approved material at least 3 ft in height. The base of the fence will be buried a minimum of 3 to 5 inches in the ground to prevent animals from crawling under and be a minimum of 3 ft in height above ground to serve as a barrier for animals moving on the ground surface. Exclusion fences shall also include provisions (e.g., ramps, one-way doors, or exit funnels) for California tiger salamanders and reptile and amphibian species to leave the work area. The fence will be pulled taut at each support to prevent folds or snags. Construction personnel will also install an orange plastic-mesh construction fence 1 ft on the development side of the exclusion fence to increase visibility unless the exclusion fence is composed of highly visible materials. Exclusion fencing shall be inspected weekly and repaired immediately when damage is observed during construction work.</p> <p>c. The following activities are prohibited, except as otherwise identified in an approved management plan, in all protected vernal pool and grassland habitat: (a) alteration of existing topography or any other alteration or uses for any purposes, including the exploration for or development of mineral extraction; (b) erection of any new structures; (c) dumping, burning, and/or burying of rubbish, garbage, or any other wastes or fill materials; (d) building of any new roads or trails; (e) killing, removal, or alteration of any existing native vegetation; (f) placement of storm water drains; (g) fire protection activities not required to protect existing structures at the project site except as provided for under Firebreak Construction and Maintenance (see below); and (h) use of pesticides or other toxic chemicals inconsistent with the product labeling.</p> <p>3. Firebreak Construction and Maintenance⁴</p> <p>a. Mowing to establish fuel breaks is preferred to disking. Mowing shall generally be conducted as late as possible in the spring, reducing the herbaceous cover to less than 2 inches in height.</p> <p>b. Where mowing is not practicable or will not provide an adequate fuel break, disking may be implemented under the following conditions:</p> <ol style="list-style-type: none"> 1) Prior to firebreak construction, "No Disk" zones shall be established for all wetlands including vernal pools and suitable aquatic habitat for Covered Species, and for areas with concentrations of fossorial mammal burrows. "No Disk" zones shall be permanently staked using metal fence posts placed at least 50 ft from the edge of the pools. A post and sign shall be installed on each side of the pool ("No Disk" zone) to warn the disk operator of the presence of habitat from each direction. 2) At those points designated as "No Disk" zones, the disk operator shall raise the disk blades out of the soil and cross the "No Disk" zone. Not until the disk blades are beyond the "No Disk" sign on the opposite side





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>of the sensitive habitat shall the operator be allowed to lower the blades, and in no case shall the operator allow the blades to touch the soil while in the “No Disk” zone.</p> <p>3) “No Disk” zones shall not be crossed if water is standing in a wetland or aquatic habitat area or if the soil is wet. In such cases, the operator must raise the disk blades and make a detour around the wetland or aquatic habitat area. Operators shall consult a site map, if available, to determine the best route around a wetland or aquatic area.</p> <p>4) Where “No Disk” zones fuel levels in wetlands, aquatic habitat, and burrow areas may compromise a firebreak’s effectiveness, the zone’s vegetation may be mowed. The clippings shall be removed by hand, with rakes, or with equipment that lifts the cuttings off the surface without removing the surface soil. Machines that vacuum the clippings shall not be used because the vacuum action may remove seeds or eggs on the soil surface. Precautions described above for general firebreak construction shall also be followed when mowing.</p> <p>c. “No Vehicle Access” areas shall also be identified. The purpose of this designation is to identify sensitive habitat areas where vehicle access shall be prohibited. Detour routes shall be identified on the site maps to allow tractors access to the firebreak routes while avoiding the endangered/threatened species habitat. “No Vehicle Access” areas shall be identified in the field by temporary signs, arrows, and flagging placed at detour points, along dirt roads, and at road intersections at least 1 week prior to firebreak construction.</p> <p>4. Dust Abatement</p> <p>a. The use of dust suppressants (other than water) shall be limited to those shown to have little or no toxicity to aquatic invertebrates and vegetation.</p> <p>b. Chemical dust suppressants shall only be used in a manner consistent with product label specifications and shall be applied employing the following BMPs:</p> <ol style="list-style-type: none"> 1) Roads and other areas to be treated shall be tight-bladed or processed (cut 2 inches and watered, then laid back with gravel and rolled [if applicable]) to bring fines to the surface. 2) Chemical dust suppressants shall be applied such that the chemical agent remains on the treated area and does not leach into adjacent aquatic habitats. 3) Chemical dust suppressants shall not be applied in wet weather. Wet weather is defined as when there has been 0.25 inch of rain in a 24-hour period or when the National Weather Service 72-hour weather forecast indicates a 30 percent or greater potential for rain. Chemical dust suppressants shall also not be applied during a dry-out period of 48 hours after wet weather.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
CALIFORNIA RED-LEGGED FROG	
RLF DES 1: Habitat Avoidance	<p>Any Covered Activity in the California Red-Legged Frog Conservation Area (Figure 4-14) that would result in the loss of aquatic habitat and associated uplands shall be avoided to the maximum extent practicable in the following locations where:</p> <ol style="list-style-type: none"> 1. The aquatic habitat contributes to the habitat quality and value of reserve/preserve lands established (or expected to be established) in perpetuity for conservation purposes; 2. The aquatic habitat lies contiguous to other aquatic habitats, such as riparian or stream corridors, or other permanently protected land; or 3. The aquatic habitat lies contiguous to high quality California red-legged frog habitat. <p>Plan Participants (or third-party applicants) proposing activities in above-listed locations that would impact California red-legged frog habitat shall provide documentation explaining why avoidance is not practicable and/or would not contribute to the conservation goals and objectives of the HCP in accordance with the procedures in Section 10.4.1. The determination of compliance with Avoidance and Minimization Measure RLF DES 1 for any proposed activity that would result in the loss of California red-legged frog habitat shall be made by SCWA in consultation with the HCP Technical Review Committee (see Section 10.2.6). All avoided habitat shall be protected and maintained under a permanent Conservation Easement, as required under Sections 7.3 and 10.5.2.</p>
RLF DES 2: Aquatic Habitat Buffers and Corridors	<p>For aquatic habitat identified in Avoidance and Minimization Measure RLF DES 1, the following site design standards shall apply in order to minimize impacts to California red-legged frog:</p> <ol style="list-style-type: none"> 1. Applicants shall provide an upland buffer between suitable California red-legged frog aquatic breeding habitat⁵ and urban development/active open space recreation areas to protect aquatic breeding habitats to the maximum extent practicable. Suitable habitats for California red-legged frogs within 300 ft of development shall be considered to be indirectly impacted and will be subject to mitigation requirements identified in Section 6.4.3. 2. Corridors shall connect avoided aquatic habitat to other suitable aquatic habitat within 0.7 mi. Corridors shall have the following minimum dimensions: <ol style="list-style-type: none"> a. Corridors 500 ft or less in length shall have a minimum width of 500 ft. b. Corridors more than 500 ft in length but less than 1,320 ft in length shall have minimum dimensions of 1:1 (i.e., a 700 ft long corridor shall be 700 ft in length). c. Corridors 1,320 ft or longer shall have a minimum width of 1,320 ft. <p>All corridors shall be protected and maintained under a permanent Conservation Easement, as required under Sections 7.3 and 10.5.2.</p>
RLF DES 3: Design Measures for New Roads	<p>New roads or the expansion of existing roads with a projected night-time traffic volume of more than 20 cars per hour in the California Red-Legged Frog Conservation Area shall incorporate design measures to facilitate the movement of small animals and maintain hydrological connectivity. Design measures may include culverts, underpasses, and roadside</p>





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>barriers to prevent animals from accessing the roads. Crossings between open space areas shall be provided in areas where concentrated movement is likely (along swales, significant slope breaks, near wetlands and breeding sites, etc.). Plan Participants (or third-party applicants) proposing road activities in the California Red-Legged Frog Conservation Area shall provide project plans to SCWA that show the specific crossing design measures, and an analysis of how the design measures will accommodate crossing by the applicable Covered and Special Management Species. The plans and analysis will be subject to the review and approval of SCWA in consultation with the HCP Technical Review Committee (see Section 10.2.6).</p>
<p>RLF CON 4: Best Management Practices to be Implemented During all Operation, Maintenance, and Construction Activities</p>	<ol style="list-style-type: none"> 1. Biological Monitor <ol style="list-style-type: none"> a. At least 15 days prior to the onset of work activities, the applicant shall submit the name(s) and credentials of biologists who will conduct California red-legged frog monitoring activities. No work activities shall begin until written approval has been received from SCWA. b. Prior to commencement of work activities, the Approved Biologist shall conduct a training session for all construction personnel. At a minimum, the training shall include: (1) a description of California red-legged frog and its habitat; (2) project-specific measures being implemented to conserve the red-legged frog and the possible penalties for not complying with these requirements; (3) approved people who are authorized to handle and relocate frogs; and (4) identification of the boundaries of permitted work areas. c. The Approved Biologist shall be present at the work site to monitor compliance with all minimization measures. The Approved Biologist shall have the authority to halt any action that might result in impacts in excess of anticipated levels. The Approved Biologist will submit a report detailing the results of the activities to SCWA within 7 days of the completion of the habitat disturbance. 2. Habitat Protection and Take Avoidance During Work Activities <ol style="list-style-type: none"> a. Exclusion fencing shall be installed prior to any required preconstruction surveys and maintained between project work areas and adjacent to preserved habitat during all work activities. Exclusion fencing will consist of silt fabric, plastic, plywood, aluminum, or other SCWA-approved material. The base of the fence will be buried a minimum of 3 to 5 inches in the ground to prevent animals from crawling under and be a minimum of 3 ft in height 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, and the supports shall be placed on the inside of the exclusion fence. Exclusion fences shall also include provisions (e.g., ramps, one-way doors, or exit funnels) for California red-legged frogs and other species to leave the work area. Construction personnel will also install an orange plastic-mesh construction fence 1 ft on the development side of the exclusion fence to increase visibility unless the exclusion fence is composed of highly visible materials. Exclusion fencing shall be inspected weekly and repaired immediately when damage is observed during construction work. b. Control of dense vegetation in and adjacent to water delivery canals (either mechanical or chemical) shall not be conducted until individuals have had sufficient time (minimum of 24 hours) to move away from the work area to more suitable habitats.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>3. Preconstruction Surveys</p> <p>a. The Approved Biologist shall survey the work site 2 weeks prior to the onset of construction activities. Any life stage of California red-legged frogs (adults, tadpoles, or eggs) found in construction areas shall be captured and relocated to secure sites approved by SCWA in consultation with the HCP Technical Review Committee. Only Approved Biologists shall participate in activities associated with the capture, handling, and monitoring of California red-legged frogs.</p> <p>4. Work Timing</p> <p>a. Work activities in riparian and aquatic habitat shall be completed between June 15 and October 15. If the applicant can demonstrate a need to conduct activities outside this time period, SCWA may authorize such activities in writing after consulting with the USFWS and CDFW.</p> <p>b. Ground-disturbing, mechanical clearing of vegetation and associated work activities in uplands shall be conducted between June 1 and November 1 or until the first fall rain that produces 0.25 inch of rainfall, unless prior surveys have been conducted and California red-legged frogs are shown to be absent from the site and the site boundary is fenced to preclude California red-legged frogs from moving onto the site.</p> <p>5. Dewatering Activities</p> <p>a. If pumping will be used to dewater the project site, intakes shall be completely screened with wire mesh no larger than 5 mm in size to prevent California red-legged frog adults and tadpoles from entering the pump.</p> <p>b. Prior to dewatering, the Approved Biologist shall capture and relocate any native fish or other vertebrate species found at the project site. Captured animals shall be relocated to a suitable pool or other location in the same water body above or below the project site.</p> <p>c. All dewatering shall be pumped into a temporary siltation pond/desilting basin, Baker tank, or similar detention device in order to allow adequate time for settling of sediments prior to their release downstream in accordance with the approved SWPPP.</p> <p>d. Following adequate settling time, 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.</p> <p>6. Exotic Species Removal</p> <p>a. The Approved Biologist shall permanently remove and humanely euthanize any exotic wildlife species, such as bullfrogs and crayfish, to the extent possible from within the project site⁶.</p> <p>7. Site Restoration</p> <p>a. After completion of any work activities that would temporarily disturb California red-legged frog aquatic or upland habitat, temporarily disturbed areas shall be restored to their original condition, including prework topography and hydrology. Disturbed areas shall be reseeded, if necessary, using local, native, noninvasive</p>





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>species seed mixes. All such restoration work shall be conducted under the supervision of an Approved Biologist.</p> <p>b. Plastic monofilament or wire mesh straw wattles or erosion control blankets shall not be used. Only erosion control materials (blankets, rolls, mats, etc.) with a minimum 2-inch square mesh made of natural coir fibers or other netting approved by SCWA in consultation with the HCP Technical Review Committee shall be used.</p> <p>8. Firebreak Construction and Maintenance⁴</p> <p>a. Mowing to establish fuel breaks is preferred to disking. Mowing shall generally be conducted as late as possible in the spring, reducing the herbaceous cover to less than 2 inches in height.</p> <p>b. Where mowing is not practicable or will not provide an adequate fuel break, disking may be implemented under the following conditions:</p> <ol style="list-style-type: none"> 1) Prior to firebreak construction, "No Disk" zones shall be established for wetlands and any significant habitat areas such as California red-legged frog aquatic habitat, and for areas with concentrations of fossorial mammal burrows. "No Disk" zones shall be permanently staked using metal fence posts placed at least 50 ft from the edge of the pools. A post and sign shall be installed on each side of the pool ("No Disk" zone) to warn the disk operator of the presence of habitat from each direction. 2) At those points designated as "No Disk" zones, the disk operator shall raise the disk blades out of the soil and cross the "No Disk" zone. Not until the disk blades are beyond the "No Disk" sign on the opposite side of the sensitive habitat shall the operator be allowed to lower the blades, and in no case shall the operator allow the blades to touch the soil while in the "No Disk" zone. 3) "No Disk" zones shall not be crossed if water is standing in wetlands, aquatic habitat, or if the soil is wet. In such cases, the operator must raise the disk blades and make a detour around the wetland or aquatic area. Operators shall consult a site map, if available, to determine the best route around this area.
CALLIPPE SILVERSPOT BUTTERFLY	
CSB DES 1: Site Design Standards in Callippe Silverspot Core Breeding Habitat	<p>The following site design standards shall apply where core breeding habitat occurs within the Callippe Silverspot Butterfly Conservation Area (Figure 4-13):</p> <ol style="list-style-type: none"> 1. All core breeding areas shall be avoided to the maximum extent practicable. Core breeding habitat is defined as a patch or series of small patches comprising approximately 0.1 ac in size with minimum <i>Viola pedunculata</i> density greater than 1 percent cover or 0.1 plant per square yard. Core breeding habitat shall be determined based on the survey requirements contained in Section 6.2.2.4. 2. Core breeding habitat shall be determined based on a minimum of 1 year of field surveys/mapping at a site. 3. Direct loss of core breeding habitat shall be limited to no more than 20 percent of any breeding habitat area. 4. All preserves established in core breeding habitat shall have a minimum 300 ft buffer consisting of upland grassland or other natural vegetation (i.e., oak savanna/woodland or riparian habitats if applicable) between the outer edge of the core breeding habitat area and incompatible uses. Breeding areas with buffers less than 300 ft will be considered to be impacted.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<ol style="list-style-type: none"> 5. All avoided breeding habitat shall have natural corridors at least 300 ft wide that are oriented along hilltops and ridgelines. 6. All avoided areas, including breeding habitat and associated corridor and buffer areas, shall be preserved in perpetuity and managed consistent with the requirements described in Sections 7.3 and 10.5.
CSB CON 2: Best Management Practices to be Implemented During all Operation, Maintenance, and Construction Activities	<ol style="list-style-type: none"> 1. Within the 300 ft buffer zone around core breeding habitat, all ground disturbance activities that could harm Johnny jump-up stands and adult nectar sources shall be limited to the period of August and April, when the Callippe silverspot butterfly is not active. 2. Prior to the start of work, temporary construction fencing and appropriate warning signs shall be placed a minimum of 300 ft from the habitat. Exclusion fencing shall be installed and maintained between project work areas and adjacent preserved habitat during all work activities. Exclusion fencing will consist of silt fabric, plywood, aluminum, or other SCWA-approved material at least 3 ft in height. The fence will be pulled taut at each support to prevent folds or snags. Construction personnel will also install an orange plastic-mesh construction fence 1 ft on the development side of the exclusion fence to increase visibility unless the exclusion fence is composed of highly visible materials. Exclusion fencing shall be inspected and repaired on a weekly basis during construction work. 3. Firebreak Construction and Maintenance⁴ <ol style="list-style-type: none"> a. Mowing to establish fuel breaks is preferred to disking. Mowing shall generally be conducted as late as possible in the spring, reducing the herbaceous cover to less than 2 inches in height. b. Where mowing is not practicable or will not provide an adequate fuel break, disking may be implemented under the following conditions: <ol style="list-style-type: none"> 1) Prior to firebreak construction, “No Disk” zones shall be established for wetlands and other significant habitat areas such as Callippe silverspot butterfly aquatic habitat, and for areas with concentrations of fossorial mammal burrows. “No Disk” zones shall be permanently staked using metal fence posts placed at least 50 ft from the edge of the pools. A post and sign shall be installed on each side of the wetland (“No Disk” zone) to warn the disk operator of the presence of habitat from each direction. 2) At those points designated as “No Disk” zones, the disk operator shall raise the disk blades out of the soil and cross the “No Disk” zone. Not until the disk blades are beyond the “No Disk” sign on the opposite side of the sensitive habitat shall the operator be allowed to lower the blades, and in no case shall the operator allow the blades to touch the soil while in the “No Disk” zone. 3) “No Disk” zones shall not be crossed if water is standing in wetlands, aquatic habitat, or if the soil is wet. In such cases, the operator must raise the disk blades and make a detour around the wetland or aquatic area. Operators shall consult a site map, if available, to determine the best route around this area. 4) In addition, prior to firebreak construction “No Disk” zones will be established with the above requirements within 50 ft of any Johnny jump-up stands and adult nectar sources.





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
RIPARIAN, STREAM, AND FRESHWATER MARSH	
RSM DES 1: Habitat Avoidance	<p>Plan Participants (or third-party applicants) shall avoid activities that will result in the loss of riparian or stream habitat that meet any one of the following conditions:</p> <ol style="list-style-type: none"> 1. Riparian or stream habitats and habitats in associated buffer zones located in Priority Drainages and Watersheds (Figure 4-10) (see Measure RSM DES 2 for buffer zone description) 2. More than 300 ft of channel in first or second order streams lacking woody riparian vegetation 3. Second order streams with riparian vegetation 4. Third, fourth, and higher order streams in non-priority watersheds 5. Activities that will create a significant barrier to wildlife movement along the stream corridor and/or significantly affect hydrological connectivity 6. Within Covered Activity Zones 2 and 3 <p>If Plan Participants (or third-party applicants) are proposing to fill any portion of a stream or permanently remove riparian habitat in any of the conditions described above, they must provide documentation explaining why avoidance is not practicable and/or would not contribute to the conservation goals and objectives of the Solano HCP. The determination of compliance with Avoidance and Minimization Measure RSM DES 1 for any proposed activity that would result in the loss of such habitat types shall be made by SCWA in consultation with the HCP Technical Review Committee (see Sections 10.2.6 and 10.4.1). In general, the level of documentation required for a project varies by the significance of the project. Activities involving perpendicular crossings for roads, utility lines, or other Covered Activities are preferable and will generally require less documentation than longitudinal impacts.</p> <p>Plan Participants (or third-party applicants) conducting routine operation and maintenance activities are exempt from the above-stated requirement, provided they comply with all applicable avoidance and minimization measures described under Section 6.3.5.2.</p>
RSM DES 2: Setbacks and Buffer Zones	<p>Native vegetated buffer zones shall be established between development and stream corridors to protect riparian and stream habitats in accordance with the following standards:</p> <ol style="list-style-type: none"> 1. For infill projects⁷, buffer zone widths shall, at a minimum, correspond to existing buffer widths found in the existing adjacent developed areas or a minimum of 1.5 times the drip line of trees and shrubs at maturity, whichever is greater. To the maximum extent practicable, buffer zones shall be widened to accomplish all of the following: (a) restoration of historical riparian vegetation stands; (b) establishment of protected zones of riparian vegetation that are at least the width of four mature riparian tree canopies; and (c) incorporation of existing native perennial upland vegetation (e.g., native grassland, oak woodland, elderberry stands, and other native shrubs). 2. For projects in the urban expansion areas along third or higher order streams and lower order streams that support riparian vegetation (Figure 6-1), buffer zones shall extend at least 100 ft from either: (a) the top of the bank, or (b) the outside edge of the existing riparian vegetation, whichever distance is greater.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<ol style="list-style-type: none"> 3. Development may encroach into the buffer zone required under Conditions 1 and 2 provided that offsets are provided elsewhere in the buffer zone. The offsets shall be situated in the remainder of the buffer zone and shall be equal or greater in size to the encroachment areas. Under no circumstances shall the total area of all encroachments exceed 25 percent of the total buffer zone area or length as specified in Condition 2. 4. The outer edges of the buffer (not to exceed 25 percent of the buffer width along third or higher order streams and lower order streams that support riparian vegetation) may also be used for public access and passive recreation such as hiking, wildlife viewing, and bicycling. For avoided first and second order streams lacking riparian vegetation, public access is limited to no more than 5 percent of the outer edge of the buffer. 5. For projects in the urban expansion areas along avoided first and second order streams lacking riparian vegetation (Figure 6-1), stream setbacks shall be at least 25 ft from the top of the bank. 6. For those projects that involve reconstruction/restoration of channelized streams (including both widening of riparian corridors and reestablishment of watercourse meander patterns), setbacks shall be at least 50 ft from either: (a) the top of the bank, or (b) the edge of the restored riparian corridor, whichever distance is greater. Creating meanders from a straight watercourse will require a wide area that encompasses the meanders and the additional 50 ft buffer from the top of bank (of the edge of the meandering watercourse) or edge of riparian vegetation (of a non-meandering watercourse). This area should provide a sufficient buffer for the watercourse and can support other native upland communities such as grasslands and oak woodlands. 7. Buffers shall be preserved in perpetuity and managed consistent with the reserve criteria described in Sections 7.3 and 10.5.2.
RSM CON 3: Riparian Tree Protection	<ol style="list-style-type: none"> 1. Where trees and/or riparian shrubs are present and will be preserved, ground disturbance shall avoid the drip line of the riparian trees and shrubs. Temporary construction fencing shall be placed at the edge of the work outside the edge of the tree drip lines. No construction work, storage of equipment or materials, or other disturbance shall be allowed in the protected areas. 2. Excavation work within a distance of 1.5 times the radius of the drip line or within a 25 ft radius of the drip lines, whichever is greater, of native riparian trees shall be done with hand tools or with light mechanized equipment (e.g., mini or light excavator or backhoe) in order to minimize disturbance or damage to roots. 3. An air spade or the equivalent shall be used to aerate and loosen any compacted soil in the structural root zone of protected trees to minimize physical injury to the tree roots. 4. Branch or root pruning of native riparian trees, if required, shall be conducted under the supervision of a Certified Arborist. 5. Equipment staging areas/storage areas shall not be located within a distance of 1.5 times the radius of the drip line or within a 25 ft radius of the drip line, whichever is greater, of native riparian trees. 6. Fill, gravel, or other construction materials shall not be stockpiled in the drip lines of native riparian trees.





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
RSM CON 4: Best Management Practices to be Implemented During all Operation, Maintenance, and Construction Activities	<ol style="list-style-type: none"> 1. Habitat Protection During Work Activities <ol style="list-style-type: none"> a. Removal of riparian vegetation to conduct operation and maintenance activities shall be limited to the minimum amount necessary to conduct such activities. Any such removal will require compensatory mitigation to reestablish riparian vegetation in accordance with Section 6.4.5. b. Exclusion fencing shall be installed prior to preconstruction surveys and maintained between project work areas and adjacent avoided habitat during all work activities. Exclusion fencing will consist of silt fabric, plywood, aluminum, or other SCWA-approved material at least 3 ft in height. The base of the fence will be buried in the ground to prevent animals from crawling under. The remainder of the fence will be left above ground to serve as a barrier for animals moving on the ground surface. Exclusion fences shall also include provisions (e.g., ramps, one-way doors, or exit funnels) for small mammal, reptile, and amphibian species to leave the work area. The fence will be pulled taut at each support to prevent folds or snags. Construction personnel will also install an orange plastic-mesh construction fence 1 ft on the development side of the exclusion fence to increase visibility unless the exclusion fence is composed of highly visible materials. Exclusion fencing shall be inspected and repaired on a weekly basis during construction work. 2. Firebreak Construction and Maintenance⁴ <ol style="list-style-type: none"> a. To the maximum extent practicable, firebreaks shall be placed along the outer edge of riparian vegetation (in accordance with the requirements of the general avoidance and minimization measures in Section 6.3.1), rather than within the riparian vegetation. b. If fuel breaks are needed in a stand of riparian woodland vegetation, the following measures shall apply to the maximum extent practicable⁸: <ol style="list-style-type: none"> 1) Only understory vegetation and lower tree branches shall be removed in order to establish a minimum 8 ft vertical clearance between the lowest live branches and understory fuels. 2) All branches up to 3 inches in diameter may be pruned. For trees that are less than 24 ft tall, a maximum of one-third of the tree height may be pruned. 3) Trimming shall be done in a manner to encourage and maintain a closed canopy in all riparian woodlands so as to minimize understory growth. 3. Dewatering Activities <ol style="list-style-type: none"> a. Water drafting, pumping, or other water diversion shall be done in a manner that is not harmful to fish or other aquatic or semi-aquatic life. Pump inflow tubes or hoses shall be screened within a 0.5 mm mesh-screened cage to exclude aquatic wildlife that may otherwise be harmed in the process. b. Prior to dewatering, the Approved Biologist shall capture and relocate any native fish or other native vertebrate species found at the project site. Captured animals shall be relocated to another suitable water body preapproved by SCWA in consultation with the Resource Agencies; the water body shall be unaffected by the work or downstream of the work area⁶. All nonnative invasive species shall be captured, removed from the project site, and humanely euthanized.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<ul style="list-style-type: none"> c. All dewatering shall be pumped into a temporary siltation pond/desilting basin, Baker tank, or similar detention device in order to allow adequate time for settling of sediments prior to their release downstream in accordance with the approved SWPPP. d. Following adequate settling time, 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. e. If cofferdams are used, turbid water pumped out of the dam shall not reenter the channel until the sediment has settled out to prevent any increase in turbidity in downstream waters. <p>4. Work Timing</p> <ul style="list-style-type: none"> a. Construction work in riparian, stream, and freshwater marsh habitats shall be conducted between April 15 and October 15, except for streams and other water bodies in the California Red-Legged Frog and Giant Garter Snake Conservation Areas (Figures 4-14 and 4-18), in steelhead or Chinook salmon streams (Figure 4-17), or where more restrictive time frames to protect nesting birds and other Covered and Special Management Species may apply. <p>5. Habitat Protection and Site Restoration</p> <ul style="list-style-type: none"> a. Disturbed areas shall be hydroseeded or stabilized using other erosion control measures prior to October 15. Hydroseed mixes used along and immediately above stream banks to stabilize disturbed areas shall not contain fertilizers or nonnative invasive species. When necessary, SCWA, in consultation with the HCP Technical Review Committee, may grant extensions of this deadline on a case-by-case basis. b. Streambed and bank construction work shall not create any physical barriers to fish migration such as artificial berms or a uniformly flat channel profile. c. Bank stabilization projects shall also incorporate bioengineering techniques and other measures to promote reestablishment of native vegetation (e.g., anchored rootwads or ballast bucket plantings in riprap). The use of hardscape such as rock riprap and floodwalls shall be minimized. d. All debris, sediment, rubbish, vegetation, or other material removed from the channel banks, channel bottom, or sediment basins shall be disposed of at an approved upland disposal site. e. Excess drainage from the construction site shall be routed away from riparian, stream, and freshwater marsh habitats. f. Any riprap placed such that it will encounter water shall incorporate large woody cover (logs), other applicable bioengineering techniques, and/or vegetation planting depending on the character of the surrounding (natural) stream banks. g. During construction, inspection of in-stream habitat and performance of sediment control devices shall occur at least once a day when there are surface waters in the channel to ensure devices are functioning properly.





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>h. Where erosion control blankets are placed in riparian zones, plantings of native riparian trees and shrub species shall occur in small openings in the erosion control blanket.</p> <p>i. Plastic monofilament or wire mesh straw wattles or erosion control blankets shall not be used. Only erosion control materials (blankets, rolls, mats, etc.) with a minimum 2-inch square mesh made of natural coir fibers or other netting approved by SCWA in consultation with the HCP Technical Review Committee shall be used.</p>
RSM CON 5: Salmonids	<p>The following measures apply to all Covered Activities affecting the main stems and tributaries (e.g., headwaters to the bay) of the following stream systems that support or have the potential to support salmonids: Green Valley Creek, Suisun Creek, Ledgewood Creek, Gordon Valley Creek, Lynch Canyon Creek (a.k.a. American Canyon), Jameson Canyon Creek, the Napa River, and Putah Creek (only for Chinook salmon) (Figure 4-17).</p> <ol style="list-style-type: none"> 1. In Covered Activity Zones 1 and 2 (Figure 1-4), in-stream work shall only be allowed from June 15 to October 31 during low-flow conditions. 2. No fill material, including concrete, shall be allowed to enter any waterways. Concrete piers, footings, or other structures shall be poured in tightly sealed forms and shall not encounter surface waters until the cement has fully cured (at least 30 days). Commercial sealants may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If sealant is used, water shall be excluded from the site until the sealant is dry. 3. Channel disturbance shall be minimized, and no material shall be left in the channel. If bridge footings are to be protected by riprap, the channel bottom elevation shall not be raised above the natural channel bottom. 4. For bridge removal, no portions of the old structure shall be left in the channel; and where abutments are removed, no depressions shall remain. Depressions shall be filled with a 2- to 5-inch layer of clean, round, river rock cobble or gravel. 5. Bridges and culverts shall be designed as full span and avoid impacts to channel hydraulics. Bridge and road design shall prevent discharge (such as culverts or bridge drains) of any untreated storm water runoff directly into any waterways. 6. Construction BMPs and erosion control methods (including revegetation of bare soil prior to October 15, unless an extension is granted by the applicable Resource Agencies) shall be implemented to prevent an increase in sediment entering waterways. 7. Construction sites shall be monitored to ensure no salmonids are present that could be harmed by construction activities. If salmonids are present, a qualified fishery biologist shall capture and relocate the fish in suitable habitat downstream of the work area. 8. Materials used for column repairs shall be non-toxic to aquatic life. 9. All equipment refueling and maintenance shall occur outside the creek channel, and appropriate measures shall be implemented to prevent the discharge of fuels or other contaminants into the stream in the event of spills. 10. Water that contacts wet concrete and has a pH greater than 9 shall be pumped out and disposed of outside the creek channel.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<ol style="list-style-type: none"> 11. Cleaning activities in designated salmonid habitat (see Chapter 4.0; Figure 4-17) shall be conducted during an appropriate work window when salmonids are less likely to be present (e.g., June 15 through October 31). 12. A qualified fishery biologist shall be present to monitor the site for the presence of salmonids and, if necessary, provide for their escape or capture and relocation. 13. All seasonal or temporary diversion dams on known or suspected salmonid streams and their tributaries shall be removed by October 31 each year, unless extensions are granted by the CDFW and NOAA NMFS. 14. Operation of heavy construction equipment in stream channels with wetted areas shall be avoided. 15. Large woody debris shall be relocated rather than removed from the stream channel in order to maintain habitat for steelhead and Chinook. 16. A hydroacoustic impact analysis and monitoring plan shall be submitted to the SCWA and the Resource Agencies for all pile driving in aquatic habitats supporting steelhead or salmon for review and written approval. This plan will contain details regarding any limitations on which type of driver should be used (e.g., vibratory or impact driver), which size pile(s) to use, what level of hydroacoustic monitoring is required, whether a noise attenuation method such as a bubble curtain should be utilized to reduce underwater sound levels, and any seasonal restrictions on pile driving that may negatively affect specific fish species. The following general measures (based on 2015 interim guidelines by the FHWG, Caltrans 2015) that shall be implemented, as applicable, include: <ol style="list-style-type: none"> a. Both the vibratory hammer driver and impact hammer pile driver are subject to the performance standards as specified by the FHWG, the specifics in the hydroacoustic monitoring plan, and what is stated below. b. A vibratory driver shall be used to the greatest extent possible before the impact driver is utilized to reduce the impact to fish species in the area. c. Where practicable, at the beginning of each construction day pile driving shall be started at a lower decibel level to stimulate avoidance behavior in fish and allow the fish time to vacate the area (known as a soft start). Then the pile driving shall be ramped up (limiting the maximum noise level to Measure 16.e below) to complete the pile driving faster. The details of the soft start will be included in the hydroacoustic monitoring plan. d. Pile driving with an impact driver shall only occur during the seasonal in-water work window specified by NOAA NMFS for this region, which is from August 1 through November 30. This limitation is for general avoidance of potential impacts to fish species in this region. The proposed work window may be adjusted based on the USFWS programmatic consultation on delta smelt. Conducting work within the work window will minimize the possibility that work activities may impact fish species as listed fish species are less likely to utilize the Plan Area as a migratory corridor during this period. e. The following sound requirements apply to pile driving with an impact hammer: accumulated SELs shall not exceed 187 dB measured at 33 ft (equivalent to 10 meters) for all listed fish, except those that are 0.07 ounce (equivalent to 2 grams) or less (Caltrans 2015). Accumulated SELs for fish weighing 0.07 ounce or less shall not exceed 183 dB measured at 33 ft. In addition, the peak sound pressure level for any single strike is 206 dB re: 1 micro-Pascal for all listed fish, except those that are 0.07 ounce or less. As a conservative measure, NOAA





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	NMFS has also identified a behavioral disturbance threshold of 150 dB re: 1 micro-Pascal Root-Mean-Square pressure for salmonids and green sturgeon as appropriate, until new information and research indicates otherwise. According to the FHWG, there are no established injury criteria for vibratory hammer pile driving (Caltrans 2015).
RSM CON 6: Valley Elderberry Longhorn Beetle	<p>The following measures apply to all Covered Activities that would entail ground-disturbing activities within 100 ft of elderberry plants⁹:</p> <ol style="list-style-type: none"> 1. A minimum setback of 20 ft from the drip line of each elderberry plant shall be established between the development and all elderberry plants containing stems measuring 1 inch in diameter or greater at ground level, except where elderberry plants are established immediately along existing roads or other paved or graveled surfaces (e.g., sidewalks, bike/pedestrian paths, facility access roads). The setback shall be fenced and flagged consistent with the general construction avoidance and minimization measures for exclusion fencing (Section 6.3.1) in order to prevent encroachment of equipment and materials. 2. Where elderberry plants are established adjacent to existing roads and facilities, construction avoidance fencing shall be provided to protect the trunk and main stems of the plant. 3. All contractors shall be briefed on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements. Work crews shall be instructed on the status of the valley elderberry longhorn beetle and the need to protect its elderberry host plant. 4. Signs shall be placed every 50 ft along the edge of the buffer zone with the following information: <i>"This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Federal Endangered Species Act. Violators are subject to prosecution, fines, and imprisonment."</i> The signs shall be clearly readable from a distance of 20 ft and must be maintained for the duration of construction. 5. Routine trimming of overgrown and overhanging elderberry shrubs that may pose a human safety threat along pathways, trails, bike paths, and roadways shall adhere to the following restrictions: <ol style="list-style-type: none"> a. Only branches and stems less than 1 inch in diameter may be trimmed or cut. b. Trimming may only occur between September 1 and March 14. Trimming is recommended from November through the first 2 weeks in February, when plants are dormant and have lost their leaves. c. Trimming shall not occur after the shrubs have leafed out (when adult valley elderberry longhorn beetles are likely to be active). d. Vegetation clearing within 5 ft of elderberry shrub stems shall be done by hand (pulling, clipping, etc.). 6. Following completion of construction work affecting the buffer zone, any damage done to the buffer zone shall be restored using native erosion control seed mixes and native riparian plant species, as appropriate. 7. Any elderberry plants that cannot be avoided during construction shall be transplanted to other appropriate locations in the buffer zone, and other mitigation as specified in Section 6.4.5.2 shall be implemented.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>8. After construction, buffer zones must continue to be protected from adverse effects of the development project. Protection measures such as fencing and signage shall be included in the project plans and are subject to the approval of SCWA in consultation with the HCP Technical Review Committee.</p> <p>9. No insecticides, herbicides, fertilizers, or other chemicals that might harm the valley elderberry longhorn beetle or its host plant shall be used in the buffer areas or within 100 ft of any elderberry plant with one or more stems measuring 1 inch in diameter or greater at ground level.</p> <p>10. Fire fuel breaks (disked land) may not be included within the 100 ft setback; however, vegetation in the setback may be cleared by mowing (e.g., mower, mechanical trimmers, hand tools) to less than 2 inches in height. The mowing of grasses/ground cover in the buffer zone may occur from July through April to reduce fire hazards. No mowing shall occur within 5 ft of elderberry plant stems. Mowing must be done in a manner that avoids damaging plants (e.g., stripping away bark through careless use of mowing/trimming equipment).</p> <p>11. An Approved Biologist shall be retained to monitor implementation and compliance of all the above measures.</p>
RSM CON 7: Tricolored Blackbird	<p>The following measures are for Covered Activities that are within 250 ft of suitable tricolored blackbird breeding habitat:</p> <p>1. During the breeding season (February 1 through August 31), an Approved Biologist shall conduct preconstruction surveys for all Covered Activities (including weed abatement/wildfire fuel reduction) in known or suitable nesting habitat areas no more than 15 days prior to scheduled work. Suitable nesting habitat includes any of the following: (a) dense vegetation near open water; (b) emergent marsh vegetation, especially cattails and tules; (c) thickets of willow, blackberry, wild rose, or thistles; and (d) silage and other grain fields such as sorghum.</p> <p>Preconstruction surveys shall be conducted for each phase of development. If ground-disturbing activities are delayed or suspended for more than 15 days following completion of the preconstruction survey, an Approved Biologist shall resurvey the site and shall conduct a second follow-up survey at least 5 days prior to the start of construction activities.</p> <p>2. A minimum 250 ft buffer shall be established between work activities and any active nests. Construction buffers may be reduced under the following conditions:</p> <p>a. A site-specific analysis prepared by an Approved Biologist indicates that construction activities would not adversely affect nesting birds. SCWA, in consultation with the HCP Technical Review Committee, must approve the analysis in writing before construction can proceed.</p> <p>b. Nesting birds do not exhibit significant adverse reaction to construction activities (e.g., changes in behavioral patterns, reactions to noise) based on sufficient monitoring (minimum of 3 consecutive days following construction initiation). Construction will stop if a significant adverse reaction is observed during any of the monitoring days and will only commence again with a 250 ft buffer once behavioral patterns return to preconstruction activities.</p> <p>c. Additional monitoring shall be required any time there is a change in heavy equipment use or activity that results in greater noise levels. A change in heavy equipment use or greater noise levels that may require additional monitoring will be determined by an Approved Biologist.</p>





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>d. Monitoring is continued at least once a week through the nesting cycle until the young have fledged and left the nest area.</p> <p>e. Monitoring reports are submitted to SCWA.</p> <p>3. The Approved Biologist has the authority to stop work at any time if signs of disturbance to the nesting colony are noted. If adverse effects are identified, construction activities shall cease immediately and construction shall not resume until SCWA and the Resource Agencies are consulted to determine if construction may continue under modified restrictions or shall be suspended until nesting activity is complete.</p> <p>4. Plan Participant and eligible third-party facilities and properties known to support tricolored blackbird breeding colonies shall retain at least 50 percent of originally available suitable nesting habitat for this species in the facility/property¹⁰ in any given year unless nesting has not occurred for a period of 5 consecutive years. If more than half the originally available nesting habitat is removed for more than 1 year, mitigation per Measure RSM MIT 13 for direct impacts shall be required.</p>
GIANT GARTER SNAKE	
GGS CON 1: Timing of Work	In-channel and upland work in the Giant Garter Snake Conservation Area shall occur between May 1 and October 1. Between October 2 and April 30, in-channel work that is limited to removal of accumulated sediments and aquatic vegetation may occur in accordance with the following restrictions: (a) all excavation/dredging shall be confined to the channel bed (below the ordinary high water mark); (b) channel banks shall not be disturbed; and (c) any dredged or excavated material shall be hauled off site or placed in areas lacking rodent burrows, riprap, or other material that might provide dormant period cover for giant garter snakes.
GGS CON 2: Best Management Practices to be Implemented During all Operation, Maintenance, and Construction Activities	<p>1. An Approved Biologist shall identify all areas of giant garter snake habitat to be avoided in or adjacent to the work area. The avoided areas shall be flagged, and signage stating "Environmentally Sensitive Area" shall be erected.</p> <p>2. All vehicles travelling on secondary roads (i.e., roads other than highways, city/county roads, and surface streets) within 200 ft of aquatic habitat in the Giant Garter Snake Conservation Area shall observe a speed limit of no greater than 20 miles per hour.</p> <p>3. Movement of heavy equipment shall be confined to existing roadways, and excavation equipment shall be operated from the tops of banks to minimize habitat disturbance.</p> <p>4. When mowing fields near streams or canals, workers shall start mowing farthest from the water in order to force snakes toward the water. By cutting the swath along the water last, the snakes will be allowed to maintain cover and escape. Vegetation shall be mowed to a minimum height of 4 inches. To maintain cover for garter snakes next to a canal, opposite banks shall be mowed on alternate years.</p> <p>5. All workers shall receive training from the Approved Biologist on how to recognize a giant garter snake and its habitat(s).</p> <p>6. Twenty-four hours prior to construction activities, the work area shall be surveyed for giant garter snakes by an Approved Biologist. Surveys shall be repeated if a lapse in construction activity of 2 weeks or greater occurs. If a giant garter snake is encountered during work, all work activities shall cease until the biologist has determined that the snake will not be harmed. Any sightings or incidental take shall be reported to SCWA.</p>

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>7. Dewatering shall be limited to the period between May 1 and October 1. Any dewatered habitat shall remain dry for at least 15 consecutive days prior to excavating or filling dewatered habitat. Any exceptions that may need to be made regarding this requirement need to be approved by SCWA in consultation with the Resource Agencies and may be subject to mitigation requirements.</p> <p>8. Gas cartridge rodenticides¹¹ will not be used to fumigate burrows in areas supporting giant garter snake between October 1 and April 30.</p> <p>9. Plastic monofilament or wire mesh straw wattles or erosion control blankets shall not be used. Only erosion control materials (blankets, rolls, mats, etc.) with natural coir fibers or other netting approved by SCWA in consultation with the HCP Technical Review Committee shall be used.</p>
COASTAL MARSH	
CM DES 1: Habitat Avoidance	Permanent fill of coastal marsh habitat shall be avoided to the maximum extent practicable. Where permanent fill is proposed, the Plan Participant (or third-party applicant) shall provide documentation explaining why avoidance is not practicable and/or would not contribute to the conservation goals and objectives of the HCP, in accordance with the procedures in Section 10.4.1. The determination of compliance with Avoidance and Minimization Measure CM DES 1 of any proposed activity that would result in the filling of coastal marsh habitat will be made by SCWA in consultation with the HCP Technical Review Committee (see Section 10.2.6).
CM DES 2: Buffers	Coastal marsh habitat shall be protected from direct and indirect impacts from Covered Development Activities through establishment of site-specific buffers that are designed to preclude changes to water and soil salinity and the flooding/inundation regime. Buffers shall be preserved in perpetuity and managed consistent with the reserve criteria described in Sections 7.3 and 10.5. Habitats within 500 ft of the boundary of existing (as of the effective date of the HCP) roads or development (includes vacant but graded and filled building pads) shall be considered to be indirectly impacted and subject to the mitigation requirements in Section 6.4.7.
CM CON 3: Best Management Practices to be Implemented During all Operation, Maintenance, and Construction Activities	<p>1. Temporary fill/disturbance of coastal marsh habitats shall be avoided to the maximum extent practicable. Any projects resulting in the loss of marsh vegetation for more than one growing season shall be required to mitigate at the ratios specified in Section 6.4.7.</p> <p>2. Native vegetation trimmed or removed on the project site will be stockpiled during work. After construction activities, when removal of temporary mats and construction-related materials and application of native seed mix have been completed, stockpiled native vegetation will be reapplied over temporarily disturbed wetlands to provide temporary soil protection and as a seed source.</p> <p>3. Where wetland vegetation removal is required, work will be conducted using hand-held tools, unless other methods are approved by the SCWA, USFWS, and CDFW, to enable wildlife to escape. Vegetation will be cut starting at the outside edge (nearest unvegetated or disturbed areas) working toward the project limits to allow wildlife opportunity to escape toward appropriate cover.</p> <p>4. Removal of vegetation in wetland habitat will be conducted with an Approved Biologist present. This monitor will watch for special-status wildlife species and temporarily stop work if special-status species are encountered. Wildlife will be allowed to escape before work is resumed. USFWS-approved biologists with appropriate qualifications to handle special-status species will be allowed to move special-status species to safe locations as permitted by the terms of their credentials.</p>





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>5. Temporarily affected (restored within 1 year) wetlands will be restored by removing construction-related debris and trash. Affected areas will be seeded with a certified weed-free, site-appropriate native seed mix, as provided in the revegetation plan developed in cooperation with the Resource Agencies. Certified weed-free mulch will be used when mulching. Rice straw may be used to mulch upland areas.</p> <p>6. Prior to removing upland habitat adjacent to pickleweed-dominated coastal marsh habitat, the upland habitat shall be mowed during the dry season so that vegetative cover has a height of no greater than 2 inches for a period of at least 2 weeks prior to the habitat removal.</p>
CM CON 4: Use of Riprap	In order to avoid attracting predators of Covered and Special Management Species associated with salt marsh habitat, the use of rock riprap shall be avoided to the maximum extent practicable within 500 ft of coastal salt marsh habitat. Where such use is unavoidable, all exposed riprap shall be covered with soil and revegetated with native marsh plants.
CM CON 5: Soft Bird's-Beak and Suisun Thistle	<p>In areas where soft bird's-beak or Suisun thistle are known to occur or suitable upper coastal marsh zone habitat exists, the following avoidance and minimization measures shall be implemented for all Covered Activities:</p> <ol style="list-style-type: none"> 1. Prior to any ground-disturbing activities, a qualified botanist shall survey for the presence of these plants or suitable habitat for these species (see Appendix B). 2. During Covered Operation and Maintenance Activities, buffers at least 100 ft wide shall be established around occupied habitat. Buffers may be reduced, if necessary, provided temporary construction fencing is installed and construction is monitored daily. Suitable habitat shall not be directly or indirectly affected through changes in hydrology, sedimentation, or contamination of the habitat or the surrounding area. Upon completion, surrounding areas shall be restored to their original condition. If seeding is necessary, local, native, noninvasive species that will not compete with the listed plants shall be used.
CM CON 6: Salt Marsh Harvest Mouse	<p>Covered Activities shall not cause mortality of salt marsh harvest mouse or loss of occupied habitat. Where the presence of salt marsh harvest mouse has been verified or where suitable core habitat (pickleweed-dominated saline emergent wetlands; see Appendix B) for the species occurs, an Approved Biologist shall assess the extent of uplands needed to provide both suitable buffer protection and suitable upland refuge habitat for salt marsh harvest mouse. For development activities adjacent to suitable habitat, the requirements of Avoidance and Minimization Measure CM CON 3 shall be met at a minimum; however, additional upland area may need to be protected. The final proposed upland protection zone shall be subject to the approval of SCWA in consultation with the HCP Technical Review Committee (see Section 10.2.6).</p> <p>For temporary construction work in salt marsh harvest mouse habitat, the following measures shall be implemented:</p> <ol style="list-style-type: none"> 1. An Approved Biologist, with previous salt marsh harvest mouse monitoring and surveying experience, will conduct preconstruction surveys for the mouse prior to project initiation and will remain on site during construction activities occurring in wetlands. The Approved Biologist will document compliance with the project permit conditions and avoidance and minimization measures. The Approved Biologist has the authority to stop project activities if any of the requirements associated with these measures is not being fulfilled. If the Approved Biologist has requested work stoppage because of take of any of the listed species, SCWA and the Resource Agencies will be notified within 1 day by electronic mail or telephone.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<ol style="list-style-type: none"> 2. If a salt marsh harvest mouse, or any mouse that construction personnel may believe is this species, is encountered during project construction, all work that could result in direct injury, disturbance, or harassment of the individual animal will immediately cease, and the site construction foreman and Approved Biologist will be immediately notified. The Approved Biologist will monitor it until he/she determines that the animal(s) is not imperiled by predators or other dangers. The Approved Biologist will notify SCWA and the Resource Agencies within 1 working day via electronic mail and telephone following any encounters and immediately after inadvertently killing or injuring a potential salt marsh harvest mouse during construction. 3. Disturbance to wetland vegetation will be avoided to the extent feasible in order to reduce potential impacts on salt marsh harvest mouse. If wetland plants cannot be avoided, they will be removed by hand (and/or by another SCWA, USFWS, and CDFW-approved method). The Approved Biologist will be on site to monitor all wetland vegetation removal activities. 4. The upper 6 inches of soil excavated within salt marsh harvest mouse habitat will be stockpiled separately and replaced on top of the backfilled material. 5. Vegetation must be cleared to bare ground. 6. Vegetation should be removed from all areas (driving roads, action area, or anywhere else that vegetation could be stepped on). 7. Work will be scheduled to avoid extreme high tides when there is potential for salt marsh harvest mouse to move to higher, drier grounds. All equipment will be staged on existing roadways away from the project site when not in use. 8. To prevent salt marsh harvest mouse from moving through the project site during construction, temporary exclusion fencing will be placed around a defined work area before construction activities start and immediately after vegetation removal. The fence should be made of a material that does not allow salt marsh harvest mouse to pass through or over, and the bottom should be buried to a depth of 2 inches so that mice cannot crawl under the fence except in situations where burial of the fence would significantly affect other species. Any supports for the salt marsh harvest mouse exclusion fencing must be placed on the inside of the project area. 9. Prior to the start of daily construction activities during initial ground disturbance, the Approved Biologist will inspect the salt marsh harvest mouse-proof boundary fence to ensure that it has no holes or rips and the base is still buried. The fenced area also will be inspected to ensure that no mice are trapped in it. Any mice found along and outside the fence will be closely monitored until they move away from the construction area. 10. No materials or supplies that could potentially entrap salt marsh harvest mice will be stored in potential salt marsh harvest mouse habitat. All equipment will be stored away from salt marsh harvest mouse habitat when not in use. 11. All disturbed areas shall be restored to the pre-project topographic and hydrologic conditions. A reclamation plan to restore vegetation to predisturbance or better conditions for the salt marsh harvest mouse shall be developed, reviewed, and approved by SCWA and the Resource Agencies and implemented and monitored for performance.





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description										
CM CON 7: Delta Smelt, Longfin Smelt, North American Green Sturgeon Southern Distinct Population Segment, and Sacramento Splittail	<p>For Covered Activities that may result in temporary impacts to delta smelt, longfin smelt, green sturgeon, and Sacramento splittail habitat, the following avoidance and minimization measures shall be implemented:</p> <ol style="list-style-type: none"> 1. In-water work shall be restricted to the period between August 1 and November 30 for the longfin smelt, green sturgeon, and Sacramento splittail, and between August 1 and October 15 for the delta smelt. Work outside these designated windows will require approval from SCWA in consultation with the HCP Technical Review Committee (see Section 10.2.6), and compliance with requirements for mitigation (see Section 6.4.7). 2. Water drafting, pumping, or other water diversion shall be done in a manner that is not harmful to fish or other aquatic or semi-aquatic life. Pump inflow tubes or hoses shall be screened within a 0.5 mm mesh-screened cage to exclude aquatic wildlife that may otherwise be harmed in the process. 3. The following actions are required for any dewatering in Coastal Marsh Conservation Areas: <ol style="list-style-type: none"> a. An Approved Biologist shall capture and relocate any native fish or other native vertebrate species found at the project site. Captured animals shall be relocated to another suitable water body preapproved by SCWA in consultation with the Resource Agencies; the water body shall be unaffected by the work or downstream of the work area. All nonnative invasive species shall be captured, removed from the project site, and humanely euthanized. b. Discharge water in construction sites exceeding the following background standards of the receiving waters, as measured in Nephelometric Turbidity Unit (NTU), shall not be directly discharged according to the following (CRWQCB 2009): <div style="margin-left: 40px;"> <p>Turbidity of 50 NTU post-BMPs or limit increase in turbidity above background level:</p> <table> <tr> <th><u>Receiving Water Background</u></th><th><u>Incremental Increase</u></th></tr> <tr> <td>Dry Creek</td><td>50 NTU</td></tr> <tr> <td>< 50 NTU</td><td>5 NTU</td></tr> <tr> <td>50–100 NTU</td><td>10 NTU</td></tr> <tr> <td>> 100 NTU</td><td>10% of background</td></tr> </table> </div> <p>All discharge water exceeding these background levels shall be pumped into a temporary siltation pond/desilting basin, Baker tank, or similar detention device in order to allow adequate time for settling of sediments prior to their release downstream in accordance with the approved SWPPP.</p> c. Following adequate settling time, 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. d. If cofferdams are used, turbid water pumped out of the dam shall not reenter the channel until the sediment has settled out to prevent any increase in turbidity in downstream waters. 4. Dredged material shall not be placed on aquatic vegetation. 	<u>Receiving Water Background</u>	<u>Incremental Increase</u>	Dry Creek	50 NTU	< 50 NTU	5 NTU	50–100 NTU	10 NTU	> 100 NTU	10% of background
<u>Receiving Water Background</u>	<u>Incremental Increase</u>										
Dry Creek	50 NTU										
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Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<ol style="list-style-type: none"> 5. Dredging or excavation shall be conducted only during low-flow periods. 6. Silt-trapping devices shall be used to minimize downstream sedimentation. 7. Rock riprap in low-flow channels shall only be used where riprap is determined to be the only feasible stabilization approach. Individual bank stabilization activities using rock riprap shall not exceed 500 ft in length along the bank, and the amount of riprap used shall not exceed 1 cubic yard per running foot placed along the bank below the ordinary high water mark without specific authorization from the Resource Agencies. 8. A hydroacoustic impact analysis and monitoring plan shall be submitted to the SCWA and the Resource Agencies for all pile driving in aquatic habitats supporting steelhead or salmon for review and written approval. This plan will contain details regarding any limitations on which type of driver should be used (e.g., vibratory or impact driver), which size pile(s) to use, what level of hydroacoustic monitoring is required, whether a noise attenuation method such as a bubble curtain should be utilized to reduce underwater sound levels, and any seasonal restrictions on pile driving that may negatively affect specific fish species. The following general measures (based on 2015 interim guidelines by the FHWG, Caltrans 2015) that shall be implemented, as applicable, include: <ol style="list-style-type: none"> a. Both the vibratory hammer driver and impact hammer pile driver are subject to the performance standards as specified by the FHWG, the specifics in the hydroacoustic monitoring plan, and what is stated below. b. A vibratory driver shall be used to the greatest extent possible before the impact driver is utilized to reduce the impact to fish species in the area. c. Where practicable, at the beginning of each construction day pile driving shall be started at a lower decibel level to stimulate avoidance behavior in fish and allow the fish time to vacate the area (known as a soft start). Then the pile driving shall be ramped up (limiting the maximum noise level to Measure 8.e below) to complete the pile driving faster. The details of the soft start will be included in the hydroacoustic monitoring plan. d. Pile driving with an impact driver shall only occur during the seasonal in-water work window specified by NOAA NMFS for this region, which is from August 1 through November 30. This limitation is for general avoidance of potential impacts to fish species in this region. The proposed work window may be adjusted based on the USFWS programmatic consultation on delta smelt. Conducting work within the work window will minimize the possibility that work activities may impact fish species as listed fish species are less likely to utilize the Plan Area as a migratory corridor during this period. e. The following sound requirements apply to pile driving with an impact hammer: accumulated SELs shall not exceed 187 dB measured at 33 ft (equivalent to 10 meters) for all listed fish, except those that are 0.07 ounce (equivalent to 2 grams) or less (Caltrans 2015). Accumulated SELs for fish weighing 0.07 ounce or less shall not exceed 183 dB measured at 33 ft. In addition, the peak sound pressure level for any single strike is 206 dB re: 1 micro-Pascal for all listed fish, except those that are 0.07 ounce or less. As a conservative measure, NOAA NMFS has also identified a behavioral disturbance threshold of 150 dB re: 1 micro-Pascal Root-Mean-Square pressure for salmonids and green sturgeon as appropriate, until new information and research indicates otherwise. According to the FHWG, there are no established injury criteria for vibratory hammer pile driving (Caltrans 2015).



**Table S.3: Avoidance and Minimization Measures**

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
CM CON 8: California Clapper Rail, California Black Rail, and Suisun Song Sparrow	<p>In areas with suitable habitat for California clapper rail, California black rail, and Suisun song sparrow, work for Covered Activities shall be conducted between September 1 and January 31 to the maximum extent practicable. Covered Activities conducted outside of this time period shall implement the following additional avoidance and minimization measures:</p> <ol style="list-style-type: none"> 1. An Approved Biologist shall conduct preconstruction protocol surveys to identify and subsequently avoid nesting areas for California clapper rail, California black rail, and Suisun song sparrow. Surveys for these species shall be conducted using standard protocols established by SCWA and the Resource Agencies. Surveys shall be designed and of sufficient intensity to document rail nesting within 500 ft of planned work activities and within 100 ft for Suisun song sparrow nesting activity. 2. If Suisun song sparrow is found to be nesting in the planned work area, a minimum 100 ft wide buffer shall be maintained between construction activities and the nest location. Buffer zones may be reduced if it can be demonstrated to the satisfaction of SCWA and the Resource Agencies that the birds would be unaffected by project-related activities. Buffers shall be maintained until the young have fledged and are capable of flight or until September 15. 3. If California clapper rail and California black rail are present in the immediate construction area, the following measures will apply during construction activities: <ol style="list-style-type: none"> a. To minimize or avoid the loss of individual rails, activities within or adjacent to suitable rail habitat will not occur within 2 hours before or after extreme high tides (6.5 ft or above, as measured at the Golden Gate Bridge), when the marsh plain is inundated. b. To minimize or avoid the loss of individual California clapper rails and black rails, activities within or adjacent to tidal marsh areas will be avoided during the breeding season from February 1 through August 31 each year unless surveys are conducted to determine rail locations and rail territories can be avoided. c. If breeding California clapper rails or black rails are determined to be present, activities will not occur within 700 ft of an identified calling center. If the intervening distance across a major slough channel or across a substantial barrier between the California clapper rail or black rail calling center and any activity area is greater than 200 ft, the activities may proceed at that location within the breeding season. d. Exception: Only inspection, maintenance, research, or monitoring activities may be performed during the California clapper rail breeding season in areas within or adjacent to California clapper rail breeding habitat with approval of the USFWS and CDFW under the supervision of a qualified biologist. 4. An Approved Biologist familiar with the habitat and ecology of California clapper rail shall be present on site during all construction activities to ensure that avoidance and minimization measures and construction limits are enforced. The Approved Biologist shall have the authority to stop any construction activity that is not consistent with approved plans and amendments.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
SWAINSON'S HAWK	
SH DES 1: Nest Tree Preservation	Trees with active Swainson's hawk nests or with historically active nests (i.e., occupied within the last 10 years) shall be avoided to the maximum extent practicable. Applicants proposing to remove an otherwise healthy nest tree shall provide written justification for the tree removal to SCWA. Sufficient rationale for tree removal shall be primarily based on declining or poor suitability of the tree as a nesting site for Swainson's hawk and/or to meet public safety needs. The justification letter shall provide a clear analysis of the biological value of the tree to Swainson's hawk under pre-project conditions and post-project conditions (if the tree were to be avoided), and will consider the presence of alternate nest sites in the vicinity of the project site. Nest trees shall only be removed if there is a biological basis that the use of the tree is unlikely under post-project conditions. SCWA, in consultation with the HCP Technical Review Committee, will be responsible for approval of the requests to remove healthy nest trees.
SH DES 2: Solano Irrigation District (SID) Annexations	<p>SID may annex additional lands into its service area until either a maximum of 3,000 ac has been annexed or 600 ac of annexed lands have been converted into crop types or land uses that are incompatible with Swainson's hawk foraging. Crop types and land uses incompatible with Swainson's hawk foraging include:</p> <ol style="list-style-type: none"> 1. Commercial feedlots, which are defined as any open or enclosed area where domestic livestock are grouped together for intensive feeding purposes; 2. Horticultural specialties, including sod, nursery stock, ornamental shrubs, ornamental trees, Christmas trees, or flowers; 3. Commercial greenhouses or plant nurseries; 4. Commercial aquaculture of aquatic plants, animals, and their byproducts; 5. Planting orchards or vineyards for the production of fruits, nuts, or berries except in designated farmstead areas; and 6. Cultivation of perennial vegetable crops such as artichokes and asparagus, and annual crops such as cotton or rice. <p>Annexations beyond the 3,000 ac maximum cap or 600 ac of cropland conversion (net total crop land conversion at the time of an annexation request) will require an amendment to the HCP (see Section 10.9.2.1).</p>
SH CON 3: Preconstruction Nest Surveys	Between March 1 and August 31 ¹² , an Approved Biologist shall conduct preconstruction surveys to identify and subsequently avoid nesting areas for Swainson's hawk. Surveys shall follow approved protocols and be of sufficient intensity to document nesting within 0.25 mi (1,320 ft) of planned work activities. A final survey shall be conducted no more than 15 days prior to the anticipated start of construction. If a lapse in project-related construction work of 15 days or longer occurs, additional preconstruction surveys shall be required before project work may be reinitiated.
SH CON 4: Active Nest Buffers	Construction work (including grading, earthmoving, and any operation of construction equipment) shall not occur within a 0.25 mi buffer zone around an active Swainson's hawk nest except as provided below. Construction work may commence in the buffer zone when an Approved Biologist has confirmed that nesting activity is complete (e.g., Swainson's hawk young have fully fledged and are capable of flight and have left the nest, or the adults have abandoned the nest for a minimum of 7 days and there is no evidence of renesting activity). Nest trees may be removed between September 16 and February 1 when nests are unoccupied.





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>The size of nest site buffer zones may be reduced only under the following conditions:</p> <ol style="list-style-type: none"> 1. A site-specific analysis prepared by an Approved Biologist indicates that the nesting pair under consideration are not likely to be adversely affected by construction activities¹³ (e.g., the nest is located in an area where the hawks are habituated to human activity and noise levels are comparable to anticipated construction work). SCWA and the Resource Agencies must approve this analysis before construction may begin within 0.25 mi of a nest. 2. Monitoring by an Approved Biologist is conducted for a sufficient time (during all construction activities for a minimum of 10 consecutive days following the initiation of construction), and the nesting pair does not exhibit adverse reactions to construction activities (e.g., changes in behavioral patterns, reactions to construction noise). 3. Monitoring is continued at least once a week through the nesting cycle at that nest. This longer-term monitoring may be reduced to a minimum of 2 hours in the morning and 2 hours in the afternoon during construction activities; however, additional and more frequent monitoring may be required if any adverse reactions are noted. 4. Weekly monitoring reports shall be submitted to SCWA and the Resource Agencies during construction and monitoring activities. <p>If adverse effects are identified, construction activities shall cease immediately and construction shall not be resumed until the Approved Biologist, in consultation with SCWA, has determined that construction may continue under modified restrictions or that nesting activity is complete.</p>
SH CON 5: Post-Construction Occupied Nest Avoidance	If a nest tree becomes occupied by Swainson's hawk during ongoing construction activities, construction activities shall not occur within 500 ft of the nest, except where monitoring consistent with the criteria in Avoidance and Minimization Measure SH CON 4 documents that adverse effects will not occur.
BURROWING OWL	
BO CON 1: Preconstruction Surveys	An Approved Biologist shall conduct preconstruction surveys in known or suitable habitat areas to identify and subsequently avoid nesting and wintering areas for burrowing owls for the entire project site, plus 500 feet of planned work activities and including access roads and staging areas. An initial preconstruction survey shall be conducted within 14 days of the anticipated start of construction, followed by a second survey within 24 hours of the start of construction. All surveys shall follow standard Solano HCP protocols ¹⁴ . If a lapse in project-related construction work of 14 days or longer occurs during the nesting season, an additional preconstruction survey shall be required within 24 hours before project work may be reinitiated.
BO CON 2: Vegetation Management	If burrowing owls or suitable nesting habitat are identified on site during the initial baseline surveys, applicants shall allow vegetation to grow over the entire project site (except for required fuel breaks) to a height of 36 inches or more above the ground, unless impracticable due to surrounding or adjacent land uses. The increased vegetation height, if in place by the beginning of the nesting season (e.g., retention of previous year's growth or planting during the previous winter), will discourage burrowing owl use of the site.
BO CON 3: Construction Buffers and Exclusion	<p>If Avoidance and Minimization Measure BO CON 2 cannot be implemented or is not effective, the following measures shall be implemented for new construction activities:</p> <ol style="list-style-type: none"> 1. During the non-breeding season (September 1 through January 31), a circular exclusion zone with a radius of 160 ft shall be established around occupied burrows.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<ol style="list-style-type: none"> 2. If a buffer cannot be established during the non-breeding season, burrowing owls shall be evicted from the entire construction area using passive relocation techniques. The applicant shall prepare an Exclusion Plan for review and approval by SCWA and the Resource Agencies that addresses the following minimum requirements: <ol style="list-style-type: none"> a. Protocols to confirm that the burrow(s) is unoccupied by burrowing owls and other species prior to destruction. Protocols shall include: <ol style="list-style-type: none"> 1) One-way doors in place a minimum of 48 hours prior to burrow excavation; 2) Twice daily monitoring to confirm evidence that owls have been excluded from the burrow; and 3) Scoping of the burrows to confirm absence. b. Procedures for how the burrow(s) will be excavated. Excavation using hand tools with refilling to prevent reoccupation is preferable whenever possible (may include using piping to stabilize the burrow to prevent collapsing until the entire burrow has been excavated and it can be determined that no owls reside inside the burrow). c. Removal of other potential owl burrow surrogates or refugia on site. d. Monitoring of the site to evaluate success and, if needed, to implement remedial measures to prevent subsequent owl use to avoid take. e. Measures to make the site inhospitable to burrowing owls and fossorial mammals (e.g., by allowing vegetation to grow tall, heavy disking, or immediate and continuous grading) until activity is complete. f. Reports describing the exclusion activities shall be submitted to SCWA. 3. During the breeding season (February 1 through August 31), an Approved Biologist shall establish a circular exclusion zone with a radius of 250 ft around each occupied burrow. No construction-related activity (e.g., site grading, staking, surveying, any use of construction equipment) shall occur in the exclusion zone during the breeding season. Once the breeding season is over, passive relocation may proceed as described in Condition 2 above. 4. Construction buffer widths may be reduced from the 250 ft wide breeding season buffers and 160 ft wide non-breeding season buffers in accordance with the following requirements: <ol style="list-style-type: none"> a. A site-specific analysis prepared by an Approved Biologist indicates that the nesting pair(s) or wintering owl(s) would not be adversely affected by construction activities. SCWA, in consultation with the HCP Technical Review Committee, must approve this analysis in writing before construction can proceed. b. Monitoring by an Approved Biologist is conducted for a sufficient time (during all construction activities for a minimum of 10 consecutive days following the initiation of construction), the nesting pair does not exhibit adverse reactions to construction activities (e.g., changes in behavioral patterns, reactions to noise), and the burrows are not in danger of collapse due to equipment traffic. c. Monitoring is continued at least once a week through the nesting/wintering cycle at that site, and no change in behavior by the owls is observed. This longer-term monitoring may be reduced to a minimum of 2 hours in the





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>morning and 2 hours in the afternoon during construction activities; however, additional and more frequent monitoring may be required if any adverse reactions are noted.</p> <p>d. Monitoring reports are submitted to SCWA.</p> <p>If adverse effects are identified, construction activities shall cease immediately, and construction shall not be resumed until the Approved Biologist, in consultation with SCWA, has determined that construction may continue under modified restrictions or that nesting activity is complete.</p>
BO CON 4: Active Relocation	<p>Active relocation of burrowing owls may be implemented as part of the Burrowing Owl Conservation Program if the relocation action is approved by SCWA and the Resource Agencies. Active relocation may be used on sites under the following conditions: where Avoidance Minimization Measures BO CON 2 and BO CON 3 are impracticable; where there is no adjacent habitat for owls to move into if passively relocated; or in order to establish owls on a reserve in the Valley Floor Grassland and Vernal Pool or Inner Coast Range Conservation Areas. Active relocation would be subject to the following requirements:</p> <ol style="list-style-type: none"> 1. A biological assessment report shall be prepared for the reserve site where owls will be relocated. The assessment will discuss in detail the suitability of the site to support both foraging and nesting burrowing owls. 2. A conservation easement shall be placed on the reserve site prior to attempted relocations. 3. A Burrowing Owl Management Plan for the reserve site shall be prepared and approved by SCWA and the Resource Agencies. 4. An assessment of the potential impacts to other burrowing owls in the vicinity shall be made. The proposed relocation must be found to have no impacts on the existing owl populations. 5. Impacts to other Covered Species shall be avoided at the reserve site. 6. A funding source shall be secured to fund the relocation, habitat maintenance, and monitoring of the relocated burrowing owls. 7. Approved Biologists shall be retained to carry out the monitoring program and prepare reports that will be submitted to SCWA.
SPECIAL MANAGEMENT SPECIES	
SMS CON 1: Preconstruction Surveys	<p>In Valley Floor Grassland and Vernal Pool, Coastal Marsh, and Riparian, Stream, and Freshwater Marsh Natural Communities, preconstruction surveys shall be conducted between February 1 and August 31 to identify and subsequently avoid nesting areas for applicable Special Management Bird Species. An Approved Biologist shall conduct these surveys no more than 15 days before the anticipated start of construction. Surveys shall be designed and of sufficient intensity to document nesting activity within 100 ft of planned work activities for passerines and within 500 ft of planned work activities for raptors. These surveys may be concurrently conducted with surveys for Covered Species.</p>
SMS CON 2: Buffer Zones	<p>If nesting passerines are present, a minimum 50 ft wide buffer shall be established between construction activities and the nest location. A minimum 250 ft wide buffer shall be established for Special Management Raptor Species. Buffers shall be maintained until the young have fledged the nest and are capable of independent flight.</p>

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>Construction buffers may be reduced from the above-stated distances in accordance with the following requirements:</p> <ol style="list-style-type: none"> 1. A site-specific analysis prepared by an Approved Biologist indicates that the nesting birds would not be adversely affected by construction activities. 2. Monitoring by the Approved Biologist is conducted for a sufficient time (minimum of 10 consecutive days following the initiation of construction), and the nesting birds do not exhibit adverse reactions to construction activities (e.g., changes in behavioral patterns, reactions to noise). 3. Regular monitoring is continued through the nesting/wintering cycle at that site, and no change in nesting bird behavior is observed. 4. Monitoring reports are submitted to SCWA. <p>If adverse effects are identified, construction activities shall cease immediately and construction shall not be resumed until the Approved Biologist, in consultation with SCWA, has determined that construction may continue under modified restrictions or that nesting activity is complete.</p>
SMS CON 3: Avoidance of “Perennialization” of Ponds and Intermittent Creeks to Protect Foothill Yellow-Legged Frogs and Western Pond Turtles	Covered Activities shall not increase urban and agricultural runoff to the extent that perennial aquatic habitats are created in the Inner Coast Range Natural Community. Covered Activities shall not construct or establish perennial ponds, water features, and small lakes in the Inner Coast Range Natural Community (see Avoidance and Minimization Measure RLF CON 4).
SMS CON 4: Minimize Impacts to Foothill Yellow-Legged Frogs and Western Pond Turtles	<p>For projects resulting in impacts to aquatic habitat known to have or that has the potential to support foothill yellow-legged frog and western pond turtle, the following BMPs shall be implemented:</p> <ol style="list-style-type: none"> 1. An Approved Biologist shall survey work sites for Covered Activities 2 weeks prior to the onset of construction activities. If any life-stage of foothill yellow-legged frog or western pond turtle is found and the habitat area cannot be avoided, the animal(s) shall be relocated to secure sites approved by SCWA. 2. The Approved Biologist shall be present at the work site until all foothill yellow-legged frogs and western pond turtles have been removed and the habitat disturbance has been completed. At that time, the contractor or permittee shall designate a person to monitor on-site compliance with all minimization measures. The monitor and the Approved Biologist shall have the authority to halt any action that might result in impacts that exceed the levels anticipated. <p>Other required avoidance and minimization measures for the Riparian, Stream, and Freshwater Marsh Natural Community (Section 6.3.5.1) and California red-legged frog (Section 6.3.2.2) provide additional measures that will be implemented concurrently with the above measure and provide various protection measures such as habitat buffers and setbacks to protect aquatic habitats for these species, applicable work windows in aquatic habitats, inclusion of barriers to prevent animal movement into construction areas, and establishment of secure uplands that can provide opportunities for western pond turtle breeding.</p>



**Table S.3: Avoidance and Minimization Measures**

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
¹ Compliance with these conditions will be determined during the lead agency Plan Participant's environmental review and project approval.	
² All wetlands within core areas shall be initially considered suitable habitat for Contra Costa goldfields. Applicants may appeal this assumption to the SCWA, USFWS, and CDFW pursuant to the Appeals Process described in Section 10.4.2. Appeals will require additional field surveys for species occurrences, habitat characterizations, and hydrological analysis of all wetlands on the site.	
³ Field surveys required to determine the absence of Covered Species must be conducted per applicable protocols (e.g., multiple visits within appropriate seasonal conditions based on reference populations; see Section 5.2) and under appropriate weather and management conditions. Negative survey results may be rejected should weather patterns be unsuitable for adequate species identification and/or the lands are managed in such a way as to minimize species identification or emergence.	
⁴ Note that fuel management zones in reserves adjacent to urban development that are equipped with sprinklers, disked, or where herbicides are used for wildfire control and fuels management may not be credited for meeting habitat mitigation requirements.	
⁵ Suitable California red-legged frog aquatic breeding habitat is defined as all standing bodies of fresh water (with salinities less than 7.0 parts per thousand), including: natural and man-made (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 (USFWS 2008b).	
⁶ Transportation of exotic wildlife, without appropriate permits, is prohibited under the California Fish and Game Code.	
⁷ For the purposes of this measure, an infill project must be 5 ac or less in size and be between two contiguous adjacent developments bordering the stream channel (one upstream and one downstream).	
⁸ These measures do not apply to elderberry trees and shrubs. See Avoidance and Minimization Measure RSM CON 6 for measures applicable to fuel breaks in the vicinity of elderberry.	
⁹ Visual evidence of valley elderberry longhorn beetle is not always evident; for the purposes of compliance with this HCP, all elderberry plants with stems meeting this minimum size should be considered occupied habitat.	
¹⁰ This measure is intended to allow clearing of old decadent and accumulated vegetation in portions of a site supporting known nesting in any given year provided suitable nesting substrate reestablishes in the cleared area for the following breeding season.	
¹¹ The use of gas cartridge rodenticides is not a Covered Activity.	
¹² Swainson's hawk in this region is typically incubating during June and active nests can be difficult to find (SHTAC 2000). As such, June surveys may not be acceptable for determining the absence of Swainson's hawk nests.	
¹³ Construction period nest buffers are more likely to be approved later in the nesting cycle, when the likelihood of nest abandonment is less (e.g., after the young have hatched).	
¹⁴ SCWA will maintain lists of Approved Biologists and current preconstruction survey protocols. In general, preconstruction protocols require multiple surveys timed to maximize the potential for observing target species.	

Abbreviations:

ac = acres

BMPs = Best Management Practices

CDFW = California Department of Fish and Wildlife

dB = decibels

FHWG = Fisheries Hydroacoustic Working Group

ft = feet

HCP = Habitat Conservation Plan

mi = miles

mm = millimeters

NOAA NMFS = National Oceanic and Atmospheric Administration, National Marine Fisheries Service

SCWA = Solano County Water Agency

SELs = sound exposure levels

SHTAC = Swainson's Hawk Technical Advisory Committee

SID = Solano Irrigation District

SWPPP = Storm Water Pollution Prevention Plan

USFWS = United States Fish and Wildlife Service

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
VALLEY FLOOR GRASSLAND AND VERNAL POOL	
VPG MIT 1: Habitat Mitigation	<p>Preservation and restoration of Covered Species habitat shall occur in the same level or higher level conservation area as the direct impact occurs (i.e., impacts to habitat in High Value Conservation Areas will be mitigated in High Value Conservation Areas, but impacts to habitat in Medium Value Conservation Areas shall be mitigated in either Medium or High Value Conservation Areas). Compensation for indirect impacts will be assessed on the location/conservation value of the habitat that is indirectly impacted and not the location of project activity (i.e., if a project activity will indirectly impact a habitat for Covered Species in a High Value Conservation Area but the project is located in a Medium or Low Value Conservation Area, compensatory mitigation shall be based on the type of habitat that is being indirectly impacted [in this case High Value Conservation Area] rather than the lower value project area). All mitigation ratios are based on impacts as assessed by acreage.</p> <ol style="list-style-type: none"> 1. High Value Vernal Pool Conservation Areas (Subareas 1A–1L, Figure 4-8) <ol style="list-style-type: none"> a. Wetland Component Direct Impacts <ol style="list-style-type: none"> 1) <i>Subareas 1A through 1F and 1I through 1L</i>: Preserve vernal pool and swale habitats at a ratio of 9:1¹ (mitigation-to-impact), and restore vernal pool and swale habitats at a ratio of 1:1 if restored habitats are in place and functional at the time of impact or at a 2:1 ratio if habitats are restored concurrent with the impact². 2) <i>Subareas 1G and 1H</i>: Preserve vernal pool and swale habitats at a ratio of 6:1, and restore vernal pool and swale habitats at a ratio of 1:1 if restored habitats are in place and functional at the time of impact or at a 2:1 ratio if habitats are restored concurrent with the impact. b. Wetland Component Indirect Impacts <ol style="list-style-type: none"> 1) <i>Subareas 1A through 1F and 1I through 1L</i>: Preserve vernal pool and swale habitats at a ratio of 3:1 for indirect impacts to avoided wetlands within 250 ft of proposed development. 2) <i>Subareas 1G and 1H</i>: Preserve vernal pool and swale habitats at a ratio of 2:1 for indirect impacts to avoided wetlands within 250 ft of proposed development. c. Upland Component Direct Impacts <ol style="list-style-type: none"> 1) <i>Subareas 1A through 1F and 1I through 1L</i>: Preserve upland habitat at a ratio of 3:1. 2) <i>Subareas 1G and 1H</i>: Preserve upland habitat at a ratio of 2:1. d. Upland Component Indirect Impacts (all subareas): Preserve avoided uplands at a ratio of 1:1 for indirect impacts to uplands within 250 ft of proposed development. 2. Medium Value Vernal Pool Conservation Areas (Subareas 2A–2N, Figure 4-8) <ol style="list-style-type: none"> a. Wetland Component Direct Impacts: Preserve vernal pool and swale habitats at a ratio of 2:1, and restore vernal pool and swale habitats at a ratio of 1:1 if restored habitats are in place and functional at the time of impact or at a 2:1 ratio if habitats are restored concurrent with the impact.





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	<p>b. Wetland Component Indirect Impacts: Preserve vernal pool and swale habitats at a ratio of 1:1 for indirect impacts to avoided wetlands within 250 ft of proposed development.</p> <p>c. Upland Component Direct Impacts: In Subareas 2C, 2E, 2F, and 2I, preserve upland habitat at a ratio of 3:1. In the remaining subareas, preserve upland habitat at a ratio of 2:1.</p> <p>d. Upland Component Indirect Impacts: Preserve avoided upland habitat at a ratio of 1:1 for indirect impacts to uplands within 250 ft of proposed development.</p> <p>3. Low Value Vernal Pool Conservation Areas and Seasonal Wetlands in Agricultural Areas of the County Outside of a Medium Value Vernal Pool Conservation Area (Area 3, Figure 4-8)</p> <p>a. Wetland Component Direct Impacts: Preserve vernal pool and swale habitats at a ratio of 1:1, and restore vernal pool and swale habitats at a ratio of 1:1 if restored habitats are in place and functional at the time of impact or at a 2:1 ratio if habitats are restored concurrent with the impact.</p> <p>b. Wetland Component Indirect Impacts: Preserve vernal pool and swale habitats at a ratio of 1:1 for indirect impacts to wetlands within 100 ft of proposed development.</p> <p>4. Mitigation for Temporary Impacts to Seasonal Wetlands and Uplands in All Conservation Areas: Temporary impacts to seasonal wetlands and uplands in all Vernal Pool Conservation Areas shall be subject to the mitigation and monitoring requirements described below. Temporary impacts to wetlands shall be calculated for the entire wetland in which the impact occurs and not just the portion disturbed by the temporary impact.</p> <p>a. Temporary Impacts: All temporary impacts lasting no more than one growing season to seasonal wetlands and uplands in all Vernal Pool Conservation Areas shall be mitigated by restoring the existing wetlands and uplands to predisturbance conditions. Direct and indirect impacts lasting longer than one growing season shall be mitigated at the standard conservation area mitigation ratios described above under conditions within Measure VPG MIT 1 for High, Medium, and Low Value Conservation Areas.</p> <p>b. Restoration and Monitoring Plan: The applicant shall provide a restoration plan consistent with the requirements in Section 10.5.4, including acceptable financial assurances, for review and approval by SCWA and the Resource Agencies, to ensure successful implementation of the habitat restoration. All temporarily impacted wetland shall be monitored for a minimum of two wet seasons to document that hydrology has been restored to pre-project conditions. Additional monitoring and remedial measures may be required if hydrology is not reestablished.</p> <p>The mitigation described above is applicable to all seasonal wetlands (i.e., saturated, seasonally flooded, and areas subject to temporary flooding sufficient to create wetlands). Conservation actions for streams and semipermanently to permanently flooded wetlands in the Valley Floor Grassland and Vernal Pool Natural Community are addressed under the Riparian, Stream, and Freshwater Marsh Natural Community (Section 6.4.5).</p>

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
VPG MIT 2: Habitat Mitigation Similarity	<p>All impacted seasonal wetlands shall be characterized according to the types below and mitigated by preservation of the same category of wetland according to the ratios in Mitigation Measure VPG MIT 1.</p> <p>1. Seasonal Wetland Categories</p> <ul style="list-style-type: none"> a. Pools: Greater than 1 inch of standing water for more than 10 continuous days with short (less than 3 weeks) to long (more than 3 weeks) durations of standing water, clear to moderate turbidity, and exhibiting significant vegetation cover. b. Playa Pools: Greater than 1 inch of standing water for more than 10 continuous days with long (more than 3 weeks) to very long durations of standing water, moderate to high turbidity, and exhibiting sparse vegetation cover (typically found in association with Pescadero Series Soils). c. Swales or Mesic Grassland: Shallow, standing water (generally less than 1 inch) present for fewer than 10 continuous days. d. Alkaline Flats and Meadows: Shallow, standing water (generally less than 1 inch) present for fewer than 10 continuous days and exhibiting indicators of high alkalinity (salt deposits on soil surface, presence of salt-tolerant plants). <p>Deviations in the required mitigation acreage by type or category may be permitted by SCWA, in consultation with the HCP Technical Review Committee, if adequate acreage of the appropriate seasonal wetland type is not available for preservation or sale in approved commercial or institutional mitigation banks or other Reserve System lands. This remainder mitigation may be achieved through one of three options:</p> <ul style="list-style-type: none"> 1. Adequate funding (to be determined by SCWA) may be placed in a special fund to purchase applicable habitats when they become available; or 2. Purchases of other mitigation types or categories may be substituted if the subject habitats are occupied by impacted Covered Species; or 3. Less common vernal pool/seasonal wetland types are substituted for more common vernal pool/seasonal wetland types (e.g., playa pools may be substituted for pools, alkaline flats and meadows may be substituted for swales or mesic grassland). <p>Under Measure VPG MIT 2, conservation habitats shall be proportional to impacts to Covered Species (Table 4.1) and Special Management Species associations (Table 4.2) (e.g., impacts to long duration, playa-type pool species such as Conservancy fairy shrimp shall not be mitigated by preservation of more abundant swale or mesic grasslands that do not support the species).</p>
VPG MIT 3: Mitigation for Impacts to Occupied Contra Costa Goldfield Habitat	<p>1. Direct Impacts: All direct impacts to extant stands of Contra Costa goldfields shall be mitigated by preserving occupied habitat at a 9:1 (mitigated-to-impacted) ratio in Subareas 1A through 1F and 1I through 1L and at a 6:1 ratio in Subareas 1G and 1H, and establishing new, self-reproducing populations of Contra Costa goldfields at a ratio of 4:1 (acres protected to acres impacted). The occupied habitat preservation component can be done concurrently with the mitigation requirements of Measure VPG MIT 1 (i.e., the 9:1 preservation is concurrent with,</p>





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	<p>not in addition to). This restoration requirement may be met by establishing new Contra Costa goldfield populations at a single-project mitigation site or by purchasing credits at an approved mitigation bank authorized to sell credits for this species in an amount equal to the 4:1 mitigation ratio.</p> <p>2. Indirect Impacts: All indirect impacts to extant stands of Contra Costa goldfields shall be mitigated by preserving occupied habitat at a 2:1 ratio.</p> <p>3. Temporary Impacts: Temporary impacts to extant stands of Contra Costa goldfields associated with Covered Activities shall not require direct compensation provided restoration activities comply with Avoidance and Minimization Measure VPG MIT 1, and all temporarily disturbed extant stands shall be restored to original conditions within 1 year at a minimum 1:1 ratio.</p> <p>Guidelines for establishing Contra Costa goldfields and the release schedule for mitigation credits at the commercial mitigation banks will be specified in the bank-enabling agreements and as certified by SCWA (see Section 10.5). Mitigation at single-project mitigation sites would be subject to the same conditions as the commercial mitigation banks. Establishment criteria shall also adhere to all the following conditions:</p> <ol style="list-style-type: none"> 1. Impacted habitat area for which mitigation is required shall be equal to the entire occupied pool/swale area, and shall not just be limited to the area with Contra Costa goldfield cover in the impacted pool. 2. Contra Costa goldfield populations and other Covered Species (including vernal pool fairy shrimp, Conservancy fairy shrimp, and vernal pool tadpole shrimp) and Special Management Species midvalley fairy shrimp shall be established in constructed, restored, and enhanced wetlands in the known range of these species in Solano County. 3. Seed used to establish new populations of Contra Costa goldfields may be obtained from any Core Population Area. Seed collection shall not affect more than 10 percent of an individual preserved population. Seed and top soils shall be salvaged from occupied vernal pools and other wetlands in an impacted area prior to initiation of ground-disturbing activities. 4. Restoration may occur in existing preserved pools currently lacking Contra Costa goldfields or in restored pools and swales in other Core Population Areas (Figure 4-5). New populations must be established in currently unoccupied habitat. 5. Reestablished populations will be considered self-reproducing when: <ol style="list-style-type: none"> a. Plants reestablish annually for a minimum of 5 years with no human intervention such as supplemental seeding, and habitat areas contain an occupied area and flower/plant density comparable to existing occupied habitat areas in similar pool types and Core Areas. <p>If Contra Costa goldfields cannot be established at the mitigation site within 5 years according to the conditions above, the preserved wetland restoration acreage shall be increased by 50 percent. The applicant shall provide bonds or other acceptable financial assurances, subject to approval by SCWA, to ensure implementation of such measures (see Section 10.5).</p>

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
VPG MIT 4: Mitigation for Impacts to California Tiger Salamander Habitat	<p>Mitigation shall be required for any Covered Activity in the known or potential range of the California tiger salamander (see Figure 4-6). Mitigation shall include preservation, enhancement, and restoration/establishment of suitable upland habitat, and preservation and construction/creation of new breeding habitat consistent with the mitigation requirements specified in Measure VPG MIT 1, subject to the following additional requirements.</p> <ol style="list-style-type: none"> 1. Breeding Habitat Mitigation: Direct impacts to all suitable California tiger salamander breeding habitat³ in the known or potential range of the species (Figure 4-6) will be mitigated by (1) preserving known breeding habitat at a 3:1 ratio (mitigated:impacted) and (2) creating new breeding habitat at a ratio of 1:1 or 0.35 ac, whichever is greater. Indirect impacts⁴ to salamander breeding habitat shall be mitigated by preserving breeding habitat at a 1:1 ratio. The minimum pond size shall be 0.35 ac for all created salamander breeding habitat to ensure the long-term viability of the breeding habitat whether it is created as mitigation for direct or indirect impacts. <p>All preserved and created/established breeding habitat shall be contiguous to at least 350 ac of preserved upland habitat, and created breeding habitat shall be located within 2,067 ft of known breeding habitat⁵.</p> <ol style="list-style-type: none"> a. All new breeding habitat shall be located within 2,067 ft of a known breeding site and be situated in a contiguous reserve/preserve area of 350 ac or more of suitable habitats. This may include other parcels if the lands are protected by conservation easements and are managed consistent with the Solano HCP Reserve Criteria in Section 10.5. For some existing preserved areas/mitigation sites, this may require that management agreements and endowments be extended to these sites. b. New breeding habitat can consist of multiple sites within 1,300 ft of each other. For newly created breeding pond complexes with multiple ponds, each pond shall be a minimum of 0.2 ac resulting in a minimum combined area of 0.35 ac for the complex unless otherwise approved by SCWA and the Technical Review Committee. <ol style="list-style-type: none"> 2. Upland Habitat Mitigation: Impacts to uplands and other movement habitats (i.e., seasonal wetland swales, meadows) in the known or potential range of the California tiger salamander (Figure 4-6) shall be mitigated at the ratios as described in Measure VPG MIT 1 subject to the following additional conditions: <ol style="list-style-type: none"> a. All upland mitigation preservation shall either be (1) within 2,067 ft of known breeding habitat itself or (2) within 1,300 ft of constructed breeding habitat if the constructed breeding habitat is within 2,067 ft of known breeding habitat. b. New breeding habitat shall be established at a ratio of 0.001 ac per acre of upland directly and indirectly impacted by a project. c. Preserves established for California tiger salamander mitigation shall include measures for restoration of upland mounds, where applicable, in order to provide increased burrowing habitat for fossorial rodents and California tiger salamanders above the shallow, rainy-season water table (see Section 10.5.4.1). 3. Temporary Impact Mitigation: Temporary impacts to all habitat in the known or potential range of the California tiger salamander including breeding habitat, uplands, and other movement habitats affected by Covered Activities shall not require direct compensation provided activities comply with Measure VPG CON 7, and all temporarily disturbed habitats shall be restored to original conditions within 1 year at a minimum 1:1 ratio.





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
VPG MIT 5: Invasive Species, Water Quality Control, Species Introductions, and Barrier Removal Enhancement Program	<p>All development projects that create new or increase impervious surfaces shall provide funding to contribute toward a grant funding program for HCP goals and objectives (specifically Objectives VPG 2.2 through 2.14, RLF 1.4, RSM 2.1, GGS 1.1, and CM 1.1) that implement cost-share programs to control invasive species, implement additional water quality control measures, establish new populations/occurrences of Covered Species, and remove barriers to Covered Species movement. Costs shall be calculated on a per-acre basis of new or increased impervious surface.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">This measure is intended to contribute to mitigation for unavoidable, cumulative adverse effects of increased urban development runoff on downstream receiving waters and associated Covered Species.</p> <p>For the Valley Floor Grassland and Vernal Pool Natural Community and associated vernal pool Covered Species, this fund will primarily be used to contribute to invasive species control and to establish new populations/occurrences of Covered Species.</p>
CALIFORNIA RED-LEGGED FROG	
RLF MIT 1: Mitigation for Direct and Indirect Impacts to Upland Habitat in the California Red-Legged Frog Conservation Area	As mitigation for conversion of upland habitats in the California Red-Legged Frog Conservation Area, upland habitat shall be preserved and managed at a 3:1 ratio (mitigation-to-impacted) for direct impacts. All upland preservation shall occur in the California Red-Legged Frog Conservation Area and be located within 0.7 mi of breeding habitats and non-breeding aquatic habitats. Indirect impacts resulting from new development within 300 ft of upland habitat in the California Red-Legged Frog Conservation Area shall provide an additional 1.5:1 ratio with preservation of known occupied upland habitat in the California Red-Legged Frog Conservation Area.
RLF MIT 2: Mitigation for Direct and Indirect Impacts to Riparian, Stream, Pond, and Freshwater Marsh Habitats in the California Red-Legged Frog Conservation Area	<p>Mitigation for unavoidable impacts to riparian, in-stream, pond, and freshwater marsh habitats in the California Red-Legged Frog Conservation Area shall be provided through the preservation, construction, and/or restoration of similar habitats at a prescribed ratio (acres restored to acres impacted) consistent with Measure RSM MIT 2 for the Riparian, Stream, and Freshwater Marsh Natural Community, but subject to the following conditions:</p> <ol style="list-style-type: none"> Direct Impacts to Aquatic Breeding Habitat: Impacted breeding habitat shall be mitigated by preserving existing occupied breeding habitat⁶ at a 2:1 ratio and constructing new breeding habitat at a minimum 2:1 ratio. If occupied breeding habitat is not available for preservation, construction of additional new breeding habitat at this same ratio may be substituted for this requirement (increasing the constructed pond ratio to 4:1). All habitat preservation, restoration, or creation shall also occur in the California Red-Legged Frog Conservation Area and be located within at least 1 mi of occupied ponds. Direct Impacts to Non-Breeding Aquatic and Riparian Habitats: Impacts to other wetland/aquatic and riparian habitats will be mitigated at a: (a) 2:1 ratio for created or restored aquatic habitats, or (b) 3:1 ratio where enhancement measures for existing habitat areas are implemented and the affected habitat is replaced (constructed) at a minimum 1:1 ratio. Non-breeding aquatic habitat consists of any typically shallow (non-lacustrine) freshwater features not suitable as breeding habitat, such as streams, small seeps, and ponds that dry too quickly for successful recruitment (USFWS 2008b). The restoration of suitable habitat or construction of new riparian and aquatic habitats shall occur in the California Red-Legged Frog Conservation Area and be located within dispersal distance of occupied habitat. An endowment fund or other approved funding source for long-term operation and maintenance of

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	<p>the features shall also be provided, including control of invasive plant and animal species (e.g., bullfrogs, pepperweed).</p> <p>3. Indirect Impacts to Aquatic and Riparian Habitats: Indirect impacts resulting from new development within 300 ft of wetland/aquatic and riparian habitats in the California Red-Legged Frog Conservation Area shall provide an additional 1.5:1 ratio with preservation of known occupied wetland/aquatic and riparian habitat in the California Red-Legged Frog Conservation Area.</p>
RLF MIT 3: Mitigation for Temporary Impacts to Upland, Marsh, Pond/Aquatic, and Riparian Habitats	<p>Temporary impacts associated with soil disturbance and removal of vegetation for ordinary channel operation and other Covered Activities in breeding and non-breeding aquatic habitats in the California Red-Legged Frog Conservation Area shall not require direct compensation for the temporary loss of herbaceous vegetation or woody vegetation less than 1 inch in diameter, provided activities comply with the riparian vegetation replacement mitigation ratios specified in Measure RSM MIT 1 and all work is conducted within specified work windows and conditions under Avoidance and Minimization Measure RLF CON 4 (Section 6.3.3). In addition, all temporarily disturbed habitats shall be restored to original conditions within 1 year at a minimum 1:1 ratio.</p> <p>If work cannot be completed in one season, mitigation shall be provided at half the habitat-specific ratios and conditions as specified in Measure RLF MIT 1 for uplands and Measure RLF MIT 2 for aquatic, wetland, and riparian habitats:</p> <ol style="list-style-type: none"> 1. Uplands: Preserve uplands at a 1.5:1 ratio. 2. Aquatic Breeding Habitat: Preserve existing occupied breeding habitat at a 1:1 ratio and construct new breeding habitat at a minimum 1:1 ratio. 3. Non-Breeding Aquatic and Riparian Habitats: Create or restore similar aquatic habitat at a 1:1 or 1.5:1 ratio where enhancement measures for existing habitat areas are implemented and the affected habitat is replaced (constructed) at a minimum 0.5:1 ratio.
RLF MIT 4: Mitigation for Impacts to Breeding and Non-Breeding Aquatic Habitat Outside of the California Red-Legged Frog Conservation Area	Compensatory mitigation for unavoidable impacts to suitable breeding and non-breeding aquatic habitat (e.g., riparian, stream, pond, and freshwater marsh habitats) outside of the California Red-Legged Frog Conservation Area shall be provided through the construction and/or restoration of similar habitats at a prescribed mitigation ratio (acres restored to acres impacted) consistent with Riparian, Stream, and Freshwater Marsh Measure RSM MIT 2, and an endowment fund or other approved funding source shall be provided to implement management plans for preserved lands in perpetuity consistent with Sections 7.3 and 10.5.
RLF MIT 5: Nonnative Predator Habitat	Development activities (including golf courses) in the California Red-Legged Frog Conservation Area and the Inner Coast Range Natural Community shall not establish new perennial ponds (including ornamental ponds), small lakes, or other perennial water bodies that could provide habitat for nonnative species that prey on California red-legged frogs (e.g., bullfrog, crayfish, and warm water fish). Storm water runoff and other associated discharges from Covered Activities shall be controlled to prevent “perennialization” of intermittent creeks. An endowment fund or other approved funding source for long-term operation and maintenance of storm water features shall also include sufficient contingency funds to control invasive species (e.g., bullfrogs) if, in the future, these features are found to support these invasive species.





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
CALLIPPE SILVERSPOT BUTTERFLY	
CSB MIT 1: Mitigation for Direct, Indirect, and Temporary Impacts to Non-Breeding Habitat in the Callippe Silverspot Butterfly Conservation Area	<p>The following mitigation measures shall be implemented for impacts in the Callippe Silverspot Butterfly Conservation Area (Figure 4-13).</p> <p>Mitigation for the conversion of non-breeding habitats in the Callippe Silverspot Butterfly Conservation Area shall be provided as described below. This measure shall be implemented concurrently with Mitigation Measure RLF MIT 1. All preserved lands shall meet the management and funding requirements identified in Sections 7.3 and 10.5.</p> <ol style="list-style-type: none"> Direct Impacts: Suitable habitat shall be preserved and managed at a 3:1 ratio. All habitat preservation shall occur in the Callippe Silverspot Butterfly Conservation Area. Indirect Impacts: These impacts resulting from new development within 300 ft of upland habitat in the Callippe Silverspot Butterfly Conservation Area shall provide an additional 1.5:1 ratio with preservation of known occupied non-breeding habitat in the Callippe Silverspot Butterfly Conservation Area. Temporary Impacts: Temporary impacts to non-breeding habitat in the Callippe Silverspot Butterfly Conservation Area shall not require direct compensation for the temporary loss of habitat provided Covered Activities are conducted within specified work windows and are consistent with Measure CSB CON 2, and all temporarily disturbed habitat is restored within 1 year at a minimum 1:1 ratio. <p>If work cannot be completed in 1 year, mitigation shall be provided at half the habitat-specific ratio and conditions as specified above (in Measure CSB MIT 1) for direct impacts to non-breeding habitat:</p> <p>Non-Breeding Habitat in the Callippe Silverspot Butterfly Conservation Area: Suitable habitat shall be preserved and managed at a 1.5:1 ratio for direct impacts.</p>
CSB MIT 2: Mitigation for Direct, Indirect, and Temporary Impacts to Breeding Habitat in the Callippe Silverspot Butterfly Conservation Area	<p>Impacts to larval host plant stands known as Johnny jump-up, adult nectar sources, and associated buffer habitats in the Callippe Silverspot Butterfly Conservation Area shall meet the following mitigation requirements. All preserved lands shall meet the management and funding requirements identified in Sections 7.3 and 10.5.</p> <ol style="list-style-type: none"> Preservation Component: Mitigation for direct, indirect, and temporary impacts to known or potential breeding habitat shall be provided as described below. <ol style="list-style-type: none"> Direct Impacts: Compensatory mitigation for the conversion/loss of known or potential breeding habitat (i.e., a core breeding area) in the Callippe Silverspot Butterfly Conservation Area shall provide an additional 3:1 ratio with preservation of known occupied habitat in the Callippe Silverspot Butterfly Conservation Area. Permanent loss of core breeding habitat shall be limited to no more than 20 percent of any breeding habitat. Core breeding habitat is defined as a patch or series of small patches comprising approximately 0.1 ac in size with minimum <i>Viola pedunculata</i> density greater than 1 percent cover or 0.1 plant per square yard. Core breeding habitat shall be determined based on the survey requirements contained in Section 6.2.2.4.

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	<p>b. Indirect Impacts: Indirect impacts resulting from new development within 300 ft of known or potential breeding habitat in the Callippe Silverspot Butterfly Conservation Area shall provide an additional 1.5:1 ratio with preservation of known occupied habitat in the Callippe Silverspot Butterfly Conservation Area.</p> <p>c. Temporary Impacts: Temporary impacts to breeding habitat in the Callippe Silverspot Butterfly Conservation Area shall not require direct compensation for the temporary loss of habitat provided Covered Activities are conducted within specified work windows and are consistent with Measure CSB CON 2, and all temporarily disturbed habitats shall be restored to original conditions within 1 year at a minimum 1:1 ratio.</p> <p>If work cannot be completed in 1 year, mitigation shall be provided at half the habitat-specific ratio and conditions as specified above (in Measure CSB MIT 2) for direct impacts to breeding habitat:</p> <p>Breeding Habitat in the Callippe Silverspot Butterfly Conservation Area: Suitable habitat shall be preserved and managed at a 1.5:1 ratio for direct impacts.</p> <p>2. Restoration Component: Both direct and indirect (within 300 ft) impacts to core Johnny jump-up host plant stands and direct impacts to adult nectar sources in the Callippe Silverspot Butterfly Conservation Area shall develop and fund additional restoration/enhancement of host plant (<i>Viola pedunculata</i>) and nectar plant habitat at a minimum 3:1 ratio. An endowment fund or other approved funding source shall be provided to implement management plans for restored lands into perpetuity.</p>
RIPARIAN, STREAM, AND FRESHWATER MARSH	
RSM MIT 1: Mitigation for Direct Impacts to Riparian, Stream, and Freshwater Marsh Habitat	<p>Note for Riparian, Stream, and Freshwater Marsh Natural Community Mitigation Measures: Not all riparian, stream, and freshwater marsh communities are mapped on Figures 3-5 and 4-10.</p> <p>Mitigation for direct impacts to Riparian, Stream, and Freshwater Marsh habitat associated with riverine systems in the Plan Area shall be provided through restoration of in-kind habitat. Restoration of riparian habitat or creation of new habitat must occur either on site, at an approved mitigation bank, or at another high-quality site, which must be capable of supporting similar quality and species as the impacted site. All Riparian Restoration Plans (see Section 10.5.4) shall be reviewed and approved by the SCWA in consultation with the HCP Technical Review Committee. Plan Participants shall direct restoration and enhancement activities toward severely degraded stream segments in Priority Drainages and Watersheds (Figure 4-10). Basic mitigation requirements are based on impact area, vegetation replacement, and designated conservation values of the Riparian, Stream, and Freshwater Marsh habitat as assessed in Section 4.3.6.3.</p> <p>1. Vegetation: All native, woody vegetation greater than 1 inch in diameter shall be replaced by planting native woody vegetation at the following minimum ratios and performance standards:</p>





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description																																																		
	<table><tr><th>Vegetation Replacement Size (inches)¹</th><th>Native Species (except Oaks and Elderberry)²</th><th>Oak Species³</th><th>Nonnative Species</th></tr><tr><td colspan="4">Priority Drainages</td></tr><tr><td><12</td><td>3:1</td><td>5:1</td><td>1:1</td></tr><tr><td>12–24</td><td>6:1</td><td>7:1</td><td>2:1</td></tr><tr><td>>24</td><td>10:1</td><td>12:1</td><td>3:1</td></tr><tr><td colspan="4">Non-Priority Drainages</td></tr><tr><td><12</td><td>3:1</td><td>5:1</td><td>1:1</td></tr><tr><td>12–24</td><td>4:1</td><td>7:1</td><td>1.5:1</td></tr><tr><td>>24</td><td>6:1</td><td>12:1</td><td>3:1</td></tr></table> <p>NOTE: Performance Criteria – The number of native riparian plants that become established at the end of the 5-year monitoring period⁴ shall equal a minimum of 80 percent of total required plantings. Established plants may include natural regeneration and volunteer plants.</p> <p>¹ Trees shall be measured at diameter at breast height (dbh); multiple trunked trees shall be reported as the cumulative total of all trunks. Shrubs shall be measured at the midpoint of the main trunk (the ground and the first major branch).</p> <p>² Elderberry replacement ratios and other associated mitigation requirements are prescribed in Measure RSM MIT 12. Tree and shrub replacement requirements under this mitigation measure may be used to fulfill all or contribute to the associated native woody riparian vegetation requirements prescribed under Measure RSM MIT 12.</p> <p>³ Due to slow growth rates, oak species require higher replacement ratios. If acorns are used instead of seedlings (at least 1 year old), planting ratios shall be doubled.</p> <p>⁴ The 5-year monitoring period for documenting successful establishment may be extended if the mitigation is not performing adequately. At a minimum, the determination of success monitoring shall require at least 2 years without significant intervention (e.g., additional plantings or irrigation). Vegetation may need to be planted at higher ratios, depending on site conditions, in order to account for mortality of planted material.</p> <p>The goal of the riparian vegetation replacement is to contribute to the establishment of a multi-story riparian community with a variety of native riparian species appropriate for the mitigation site. Plantings are not required to directly replace impacts on a species-by-species basis.</p> <p>2. Area: Riparian and channel mitigation shall also achieve the following area criteria based on whether the mitigation is achieved through enhancement (e.g., supplemental planting of existing riparian habitats) or through establishment of new channel and woody riparian habitats (e.g., existing or created channel lacking native woody riparian vegetation):</p> <table><tr><th rowspan="2"></th><th colspan="2">Priority Drainages</th><th colspan="2">Non-Priority Drainages</th></tr><tr><th>Enhancement</th><th>Created/Restored</th><th>Enhancement</th><th>Created/Restored</th></tr><tr><td>Area Ratios</td><td>4:1</td><td>2:1</td><td>3:1</td><td>2:1</td></tr></table>	Vegetation Replacement Size (inches) ¹	Native Species (except Oaks and Elderberry) ²	Oak Species ³	Nonnative Species	Priority Drainages				<12	3:1	5:1	1:1	12–24	6:1	7:1	2:1	>24	10:1	12:1	3:1	Non-Priority Drainages				<12	3:1	5:1	1:1	12–24	4:1	7:1	1.5:1	>24	6:1	12:1	3:1		Priority Drainages		Non-Priority Drainages		Enhancement	Created/Restored	Enhancement	Created/Restored	Area Ratios	4:1	2:1	3:1	2:1
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Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	<p>3. Hydrological and Biological Connectivity: Mitigation for long-term impacts to third and higher order streams and second order streams with riparian vegetation shall maintain the hydrologic and biological connectivity between downstream and upstream areas. Facilities such as bridges, culverts, outfalls, and grade control structures shall not create cumulative gaps in the channel or riparian corridor greater than 100 ft in length than conditions at the time of the adoption of the HCP. Bypass or rerouted channels shall be constructed where necessary to replace impacted habitats and to limit gaps between existing riparian habitats.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">The intent of requiring mitigation for removal of nonnative trees and shrubs is to protect riparian habitat. It is not intended to require mitigation for the removal of nonnative trees or shrubs as a part of riparian restoration or enhancement projects.</p> <p>The above measure does not apply to the undergrounding or lining of irrigation supply ditches for water conservation purposes. However, conversion or loss of ditches subject to Section 404 of the Clean Water Act for urban development or other Zone 1 or 2 Covered Activities would be subject to the mitigation requirements.</p>
RSM MIT 2: Mitigation for the Loss or Fill of Ponds, Freshwater Marsh Habitat, and Channels	Mitigation for direct impacts to ponds, freshwater marsh habitat, or channels shall be provided at a 2:1 ratio for non-priority drainages and at a 3:1 ratio for priority drainages. This mitigation may be achieved by creating/restoring on-site open space areas with a minimum 100 ft wide buffer, establishing an endowment or other suitable funding source for long-term management of the mitigation habitat, or purchasing credits at an approved mitigation bank. No mitigation is required for indirect impacts to ponds, freshwater marsh habitat, and channels provided that the project complies with Measure RSM DES 2.
RSM MIT 3: Mitigation for the Loss or Fill of Seasonal Wetlands	Mitigation for direct impacts to seasonal wetlands in the Plan Area shall be provided at a 2:1 ratio. Mitigation for indirect impacts to seasonal wetlands within 100 ft of the seasonal wetlands shall be provided at a 1:1 ratio.
RSM MIT 4: Mitigation for Temporary Impacts to Riparian, Stream, and Freshwater Marsh Habitat	<p>Temporary impacts (i.e., typically where project activities result in the removal of vegetation, except woody riparian vegetation, lasting no more than one growing season) associated with ordinary channel operation and maintenance activities conducted by Plan Participants, or construction/installation of permanent features (e.g., outfalls, bridges, utility lines), except in designated giant garter snake habitat areas (see Section 6.4.6), shall comply with the following conditions:</p> <ol style="list-style-type: none"> 1. Implement appropriate erosion control measures, including reseeding disturbed soils with an appropriate seed mix, for all disturbed areas above the water body's ordinary high water mark consistent with general avoidance and minimization measures (Section 6.3.1). 2. Conduct all work associated with ordinary channel operation and maintenance activities in compliance with general avoidance and minimization measures (Section 6.3.1). 3. Implement BMPs consistent with Measure RSM CON 4 (Section 6.3.5.2) for all work associated with new development projects. 4. Replace all native, woody riparian vegetation greater than 1 inch in diameter consistent with the replacement mitigation ratios specified in Measure RSM MIT 1. 5. Restore channel or bank disturbance to original conditions at a 1:1 ratio.





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	<p>NOTE</p> <p>Measure RSM MIT 4 does not apply to maintenance and operation of constructed irrigation supply ditches associated with ongoing agricultural activities.</p>
RSM MIT 5: Base Flow	New developments shall not result in any increase in the base flood elevation. "Base flood" means a flood with a 1 percent chance of being equaled or exceeded in any given year (also called the "100-Year Flood").
RSM MIT 6: Development in Watersheds of Priority Drainages	In Priority Drainages and Watersheds (Figure 4-10), new urban development projects more than 10 ac in size shall detain water for a minimum of 12 to 24 hours for discharges that exceed pre-project level, 2-year recurrence, and 24-hour storm event discharges. All flood control and water quality basins in Priority Drainages and Watersheds shall be designed to minimize the establishment and expansion of nonnative species such as bullfrog and warm water fish consistent with Measure RSM MIT 8.
RSM MIT 7: Restoring Naturalized Channel Processes	New urban development projects bordering Priority Drainages (Figure 4-10) shall restore and expand riparian habitat along existing stream and flood channels to allow more naturalized channel processes to occur and riparian vegetation to establish. Channel design standards shall include, but not be limited to, establishing a two-stage floodplain corridor that allows natural channel meander patterns to develop while still providing for riparian habitat restoration and protection, and adequate capacity to meet flood control requirements.
RSM MIT 8: Prevent the "Perennialization" of Ponds and Intermittent Creeks	Development activities shall not establish perennial ponds and small lakes, and urban runoff shall be controlled to prevent "perennialization" of intermittent creeks in the Inner Coast Range Natural Community and California Red-Legged Frog Conservation Area.
RSM MIT 9: Storm Water Discharge	<p>Municipal Plan Participants shall require all new development and redevelopment projects that will increase directly connected impervious area (DCIA) to filter, retain, detain, or infiltrate storm water prior to discharge consistent with NPDES permit requirements established by the RWQCB. Such developments shall be required to implement storm water management plans to adequately treat urban runoff prior to discharge into wetlands, streams, rivers, ponds, or other local water bodies or into municipal storm systems that discharge to aquatic habitats. Minimum design standards for structural or treatment control storm water runoff shall be determined by one of the following methods⁷:</p> <ol style="list-style-type: none"> 1. Volumetric Treatment Control BMPs (e.g., water quality ponds, treatment wetlands) <ol style="list-style-type: none"> a. Treat runoff up to and including the 85th percentile, 24-hour runoff event determined as the maximum capture of storm water volume for a specific jurisdiction, according to the formula recommended in <i>Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87</i> (or most current update); or b. Treat runoff up to and including the annual runoff volume based on a unit basin storage water quality volume, by the method recommended in <i>California Stormwater Best Management Practices Handbook – Industrial Commercial</i> (CASQA 2004) to achieve 80 percent or more volume treatment; or c. Treat runoff up to and including the runoff volume produced from a 0.75-inch storm event, prior to its discharge to a storm water conveyance system; or d. Treat runoff up to and including the runoff volume produced from a historical record-based reference, 24-hour criterion for "treatment" that achieves approximately the same reduction in pollutant loads achieved by the 85th percentile, 24-hour runoff event; or

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	<p>e. Treat runoff up to and including the flow of runoff produced by a rain event of at least 0.2 inch per hour; or</p> <p>f. Treat runoff up to and including the flow of runoff produced by a rain event of at least twice the 85th percentile hourly rainfall intensity for the applicable Plan Participant jurisdiction; or</p> <p>g. Treat runoff up to and including the flow of runoff produced by a rain event resulting in the treatment of an equivalent portion of runoff as treated by the volumetric standards above.</p> <p>The water quality protection measures are adapted from the SWRCB Phase II NPDES general storm water permit standards and contribute to maintaining and improving the chemical, physical, and biological integrity of waters in the Plan Area. All storm water-related mitigation measures shall conform to NPDES permit requirements in place at the time of a project's approval when such permit requirements exceed the minimum standards presented in the HCP (e.g., the more protective standards shall apply).</p>
RSM MIT 10: Invasive Species, Water Quality Control, Species Introductions, and Barrier Removal Enhancement Program	<p>All development projects that create new or increase impervious surfaces shall provide funding to contribute toward a grant funding program (see Objectives RSM 2.1, GGS 1.1, and CM 1.1) to implement cost-share programs to control invasive species, implement additional water quality control measures, establish new populations/occurrences of Covered Species, and remove in-stream barriers. Costs shall be based on a per-acre basis of new or increased impervious surface.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Measure RSM MIT 10 is intended to contribute to mitigation for unavoidable, cumulative adverse effects of increased urban development runoff on downstream receiving waters and associated Covered Species.</p>
RSM MIT 11: New Stream Crossings	<p>New crossings in streams that are known to, or have the potential to, support salmonids (i.e., the main stems and tributaries to Lynch Canyon, Jameson Canyon, Ledgewood, Green Valley, Gordon Valley, and Suisun creeks, and the Napa River) shall adhere to the guidelines developed by NOAA NMFS and CDFW for safe passage of salmonids. The following alternatives and structure types shall be considered in order of preference:</p> <ol style="list-style-type: none"> 1. Nothing: Realign the road to avoid crossing the stream. 2. Bridge: Span the stream to allow for long-term dynamic channel stability. 3. Streambed Simulation Strategies: Implement a bottomless arch, embedded culvert design, or ford. 4. Non-Embedded Culvert: Utilize a non-embedded culvert or hydraulic design for limited to low slopes. 5. Baffled Culvert or Structure Designed with a Fishway: Utilize a baffled culvert or similar facility for steeper slopes. <p>If a crossing is proposed in a known salmonid spawning area, only full-span bridges or culverts that provide natural streambed substrates are acceptable.</p>





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description																									
RSM MIT 12: Elderberry Shrub Mitigation for Valley Elderberry Longhorn Beetles	<p>Where removal of elderberry shrubs or their stems measuring 1 inch in diameter or greater is unavoidable, these impacts shall be mitigated. Removal of elderberry shrubs or stems 1 inch in diameter or greater and associated riparian vegetation shall not create gaps in a riparian corridor greater than 100 ft in length than conditions at the time of the adoption of the HCP. Mitigation will include salvaging and replanting affected elderberry shrubs and planting additional elderberry shrubs and associated native riparian plants according to the following criteria:</p> <ol style="list-style-type: none">Transplanting Removed Elderberry Shrubs: Transplant removed elderberry shrubs to an approved, secure site, such as an approved mitigation bank location in Solano County or non-bank relocation site to be approved by the SCWA. All non-bank relocation sites shall meet the minimum reserve standards identified in Section 10.5 (e.g., site shall be protected by a conservation easement or other applicable protection measure, and funding shall be provided for long-term monitoring and maintenance). Transplanting shall occur between June 15 and March 15 (November through February is the optimal period for transplanting). Elderberry may not be transplanted between March 16 and June 14 except where isolated bushes are located more than 0.5 mi from other suitable valley elderberry longhorn beetle habitat and no signs of use (exit holes) have been identified.Mitigation for Whole Shrub Removal: For each removed elderberry bush, plant a minimum of five elderberry seedlings or rooted cuttings and five associated native, woody riparian plants in the mitigation area, or purchase applicable credits from a mitigation bank approved under the Solano HCP to sell valley elderberry longhorn beetle credits.Mitigation for Trimming/Removal of Stems 1 Inch in Diameter or Greater: Trimming/removal of elderberry stems 1 inch in diameter or greater shall be mitigated by planting elderberry seedlings and associated native plant species at the following ratios based on stem size and presence of valley elderberry longhorn beetle exit holes: <table><thead><tr><th><u>Elderberry Stem Size</u></th><th><u>Exit Holes on Shrub (Y/N)</u></th><th><u>Elderberry Seedling Ratio</u></th><th><u>Associated Native Plant Ratio</u></th></tr></thead><tbody><tr><td rowspan="2">Stems ≥ 1” & ≤ 3”</td><td>No:</td><td>2:1</td><td>1:1</td></tr><tr><td>Yes:</td><td>4:1</td><td>2:1</td></tr><tr><td rowspan="2">Stems > 3” & ≤ 5”</td><td>No:</td><td>3:1</td><td>1:1</td></tr><tr><td>Yes:</td><td>6:1</td><td>2:1</td></tr><tr><td rowspan="2">Stems > 5”</td><td>No:</td><td>4:1</td><td>1:1</td></tr><tr><td>Yes:</td><td>8:1</td><td>2:1</td></tr></tbody></table> <p>Mitigation plantings shall occur, to the maximum extent practicable, in areas adjacent to the impact area and/or in existing gaps in riparian corridors. Priority areas for riparian revegetation and planting of elderberry include Alamo, Ulati, and Putah creeks in order to expand suitable habitat for the valley elderberry longhorn beetle in the Plan Area. The requirements for associated native, woody riparian plant establishment may be fulfilled in combination with the woody riparian vegetation replacement requirements prescribed under Mitigation Measure RSM MIT 1.</p>	<u>Elderberry Stem Size</u>	<u>Exit Holes on Shrub (Y/N)</u>	<u>Elderberry Seedling Ratio</u>	<u>Associated Native Plant Ratio</u>	Stems ≥ 1” & ≤ 3”	No:	2:1	1:1	Yes:	4:1	2:1	Stems > 3” & ≤ 5”	No:	3:1	1:1	Yes:	6:1	2:1	Stems > 5”	No:	4:1	1:1	Yes:	8:1	2:1
<u>Elderberry Stem Size</u>	<u>Exit Holes on Shrub (Y/N)</u>	<u>Elderberry Seedling Ratio</u>	<u>Associated Native Plant Ratio</u>																							
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Stems > 3” & ≤ 5”	No:	3:1	1:1																							
	Yes:	6:1	2:1																							
Stems > 5”	No:	4:1	1:1																							
	Yes:	8:1	2:1																							

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
RSM MIT 13: Direct Loss or Conversion of Tricolored Blackbird Foraging Habitat	<p>Mitigation for the direct disturbance, destruction, or conversion of tricolored blackbird foraging habitat⁸ for urban development or other permanent facilities shall be provided at a 1:1 ratio. Sites that have been occupied at any time during the past 5 years will be considered occupied by tricolored blackbirds and will require additional nesting habitat mitigation including funding for protection of the existing tricolored blackbird colonies (Section 11.1.5). All foraging habitat affected either directly or indirectly by the project will be subject to the compensation requirement. Mitigation lands used to satisfy mitigation measures for other Natural Communities and/or Covered Species (i.e., Valley Floor Grassland and Vernal Pool Natural Community [excluding the wetland restoration/construction component], Coastal Marsh Natural Community, Swainson's hawk, California red-legged frog, and Callippe silverspot butterfly) can be used to satisfy tricolored blackbird conservation if the reserve area meets the basic reserve management standards (Sections 7.3 and 10.5.3) and criteria specified in Objective RSM 1.2 (Section 5.6.1).</p> <ul style="list-style-type: none"> Exemptions: Infill projects on small, infill lots (which are not part of undeveloped lands greater than 5 ac of contiguous habitat) and which are bordered by contiguous urban development (based on conditions at the time the HCP is adopted) would have minimal effects on the extent and quality of tricolored blackbird habitat and are exempt from foraging habitat mitigation requirements. Nonetheless, project proponents are obligated to avoid destruction of active tricolored blackbird nest colonies and take of tricolored blackbirds in compliance with the Federal MBTA and California Fish and Game Code Section 3503.5 and to meet the requirements specified in Avoidance and Minimization Measure RSM CON 7. <p>Temporary impacts associated with Covered Activities affecting tricolored blackbird foraging habitat shall not require direct compensation provided activities comply with Measure RSM CON 7, and all temporarily disturbed habitats shall be restored to original conditions within 1 year at a minimum 1:1 ratio.</p>
GIANT GARTER SNAKE	
GGS MIT 1: Operation and Maintenance Habitat Mitigation	<p>The following mitigation measures are for Covered Activities within 200 ft of suitable giant garter snake aquatic habitat in the Giant Garter Snake Conservation Area (Figure 4-18).</p> <p>SCWA, RD 2068, MPWD, Dixon RCD, the City of Vallejo Water Division (VWD), and SID shall acquire, enhance/restore, and manage 85 ac of aquatic and 22 ac of associated upland habitat for giant garter snake as mitigation for ongoing operation and maintenance activities for their facilities in the Giant Garter Snake Conservation Area (Figure 4-18).</p>
GGS MIT 2: Mitigation for Direct and Indirect Impacts to Giant Garter Snake Habitat	<p>Compensatory mitigation for unavoidable direct and indirect impacts to suitable aquatic and associated upland habitat (i.e., 200 ft from the edge of aquatic habitat) in the Giant Garter Snake Conservation Area (Figure 4-18) shall be provided as follows:</p> <ol style="list-style-type: none"> Aquatic Component Direct Impacts: Restore aquatic habitat at a ratio of 3:1 (mitigation-to-impact) and restore upland habitat adjacent to restored aquatic habitat at a ratio of 2:1 restored upland acres to restored aquatic acres. Aquatic Component Indirect Impacts⁹: Restore aquatic habitat at a ratio of 1.5:1 for avoided wetlands within 200 ft of proposed development, and restore upland habitat adjacent to restored aquatic habitat at a ratio of 1:1 restored upland acres to restored aquatic acres.





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	<p>Upland mitigation requirements may be substituted by providing additional giant garter snake aquatic habitat at a ratio of 0.5:1 (additional aquatic habitat: required upland mitigation), if a sufficient portion (generally 20 to 25 percent) of the reserve is composed of associated upland habitat.</p> <p>Note: Upland mitigation requirements are based on required aquatic habitat mitigation. Mitigation requirements for direct impacts to uplands within 200 ft of giant garter snake aquatic habitat are specified as part of the broader Valley Floor Grassland and Vernal Pool Natural Community or Swainson's Hawk/Agricultural Community conservation requirements. The 175 ac of restored and enhanced aquatic habitat for giant garter snakes (Objectives GGS 1.2 and 1.3) will also contribute to the conservation of the Covered Species tricolored blackbird, and Special Management Species Modesto song sparrow and yellow-headed blackbird.</p> <p>3. Temporary Impacts: Temporary impacts associated with Covered Activities affecting giant garter snake habitat shall not require direct compensation provided activities comply with Measures GGS CON 1, GGS CON 2, and RSM CON 4, and all temporarily disturbed habitats shall be restored to original conditions within 1 year at a minimum 1:1 ratio.</p> <p>This Mitigation Measure GGS MIT 2 meets Goal GGS 1 and Objectives GGS 1.2 and 1.3.</p>
GGs MIT 3: Invasive Species, Water Quality Control, Species Introductions, and Barrier Removal Enhancement Program	<p>All development projects that create new or increase impervious surfaces shall provide funding to contribute toward a grant funding program (see Objectives RSM 2.1, GGS 1.1, and CM 1.1) to implement cost-share programs to control invasive species, implement additional water quality control measures, establish new populations/occurrences of Covered Species, and remove in-stream barriers. Costs shall be based on a per-acre basis of new or increased impervious surface.</p> <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Mitigation Measure GGS MIT 3 is intended to contribute to mitigation for unavoidable, cumulative adverse effects of increased urban development runoff on downstream receiving waters and associated Covered Species.</p>
COASTAL MARSH	
CM MIT 1: Mitigation for Direct Impacts to Marsh Habitat	<p>The following mitigation measures are designed to mitigate future direct, indirect, and temporary impacts associated with urban development and other Covered Activities in the Coastal Marsh Natural Community (Figure 4-20).</p> <p>Mitigation for unavoidable direct impacts to coastal marsh habitats shall be provided through the creation and/or restoration of tidally influenced coastal marsh at a 3:1 ratio of acres restored to acres impacted. Required ratios shall be applied and implemented to establish marsh communities (e.g., deep water, shallow water/mudflat, low marsh, mid marsh, high marsh, and upland) commensurate with impacted habitat.</p>
CM MIT 2: Mitigation for Indirect Impacts to Marsh Habitat	<p>Mitigation for indirect impacts to avoided marsh habitat within 500 ft of proposed development shall be provided through the restoration of tidally influenced coastal marsh at a 1.5:1 ratio of acres restored to acres impacted. Required ratios shall be applied and implemented to establish marsh communities (e.g., deep water, shallow water/mudflat, low marsh, mid marsh, high marsh, and upland) commensurate with impacted habitat.</p>

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
CM MIT 3: Mitigation for Direct Impacts to Shallow Water Habitat	Mitigation for the fill or shading of shallow water habitat shall be provided through the restoration of shallow water habitat at a 3:1 ratio or enhancement of existing shallow water habitat at a 4:1 ratio (impacts and mitigation are acreage based). Shallow water habitat is defined as waters between Mean High Water and 10 ft below the Mean Lower Low Water mark. The footprint of the structure shall be used to calculate the shadow zone and to offset all adverse effects resulting from the project. For example, a boat dock with a surface area of 400 sf (40 ft by 10 ft) will need to preserve, create, or restore 1,200 sf (a 3:1 ratio) of shallow water habitat.
CM MIT 4: Mitigation for Temporary Impacts to Marsh Habitat	Mitigation for unavoidable temporary (requires no more than one growing season to reestablish native coastal marsh vegetation or benthic communities in shallow water habitat) impacts to coastal marsh habitats shall be provided through the restoration or enhancement of tidally influenced coastal marsh at a 1.5:1 ratio of acres restored to acres impacted. Required ratios shall be applied and implemented to restore or enhance marsh communities (e.g., deep water, shallow water/mudflat, low marsh, mid marsh, high marsh, and upland) commensurate with impacted habitat. Restoration efforts shall be required to develop a Restoration and Enhancement Plan consistent with the criteria in Section 7.3.2.1.
CM MIT 5: Dry Season Nuisance Flows	All new and redevelopment projects in watercourses that drain to Suisun Marsh, Southampton Marsh, Napa River, and San Pablo Bay shall incorporate source control and treatment measures to evaporate or infiltrate all dry season runoff.
CM MIT 6: Invasive Species, Water Quality Control, Species Introductions, and Barrier Removal Enhancement Program	All development projects that create new or increase impervious surfaces shall provide funding to contribute toward a grant funding program (see Objectives RSM 2.1, GGS 1.1, and CM 1.1) to implement cost-share programs to control invasive species, implement additional water quality control measures, establish new populations/occurrences of Covered Species, and remove in-stream barriers. Costs shall be based on a per-acre basis of new or increased impervious surface. NOTE Mitigation Measure CM MIT 6 is intended to contribute to mitigation for unavoidable, cumulative adverse effects of increased urban development runoff on downstream receiving waters and associated Covered Species.
CM MIT 7: Covered Plant Species Salvage and Recovery	Covered Activities that will impact populations of soft bird's-beak, Suisun thistle, and Mason's lilaeopsis shall be required to implement salvage and recovery programs. Salvage and recovery plans shall include measures to transplant plants or collect seed from impacted populations for at least one season prior to loss. Salvaged plants and collected seeds shall be used to establish new populations of similar size and number of plants impacted. Salvage and restoration plans shall be subject to review and approval by SCWA and the Resource Agencies.
CM MIT 8: Mitigation for Delta Smelt and Sacramento Splittail Habitat	SCWA, RD 2068, MPWD, and Dixon RCD shall acquire, enhance/restore, and manage 85 ac of shallow water aquatic habitat suitable for delta smelt and Sacramento splittail as mitigation for ongoing operation and maintenance activities for their facilities in the Giant Garter Snake Conservation Area (Figure 4-18). This mitigation measure shall be implemented in conjunction with Measure GGS MIT 1.
SWAINSON'S HAWK	
SH MIT 1: Irrigated Agriculture Foraging Habitat Conservation	<ol style="list-style-type: none"> Direct Impacts: Direct impacts to Swainson's hawk foraging habitat in the Irrigated Agriculture Conservation Area (Figure 4-21) shall be mitigated through the preservation and management of foraging habitat at a ratio of 1:1 (mitigation-to-impact). Mitigation shall be provided in the Irrigated Agriculture Potential Reserve Area (Figure 4-27). Indirect Impacts: Indirect impacts to Swainson's hawk foraging habitat within 250 ft of development shall be mitigated through the preservation and management of foraging habitats at a ratio of 0.5:1.





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	3. Temporary Impacts: Temporary impacts to Swainson's hawk foraging habitat shall not require direct compensation provided activities comply with Measure SH CON 4, and all temporarily disturbed habitats shall be restored to original conditions within 1 year at a minimum 1:1 ratio.
SH MIT 2: Valley Floor Grassland Foraging Habitat Conservation	<p>1. Direct Impacts: Direct impacts to Swainson's hawk foraging habitat in the Valley Floor Grassland and Vernal Pool Conservation Area (Figure 4-21) shall be mitigated through the preservation and management of foraging habitat at a ratio of 1:1 (mitigation-to-impact). Mitigation shall be provided in the Irrigated Agriculture or Valley Floor Grassland and Vernal Pool Potential Reserve Areas (Figure 4-27). Preservation of valley floor grassland habitat may be satisfied through Measure VPG MIT 1 if the minimum 1:1 mitigation ratio for foraging habitat is achieved.</p> <p>2. Indirect Impacts: Indirect impacts to Swainson's hawk foraging habitat within 250 ft of development are covered under mitigation requirements for the Valley Floor Grassland and Vernal Pool Natural Community, including Measure VPG MIT 1 requirements.</p> <p>3. Temporary Impacts: Temporary impacts to Swainson's hawk foraging habitat are covered under mitigation requirements for the Valley Floor Grassland and Vernal Pool Natural Community, including Measure VPG MIT 1 requirements. Temporary impacts to Swainson's hawk foraging habitat shall not require direct compensation provided all temporarily disturbed habitats are restored to original conditions within 1 year at a minimum 1:1 ratio.</p>
SH MIT 3: Inner Coast Range Foraging Habitat Conservation	<p>1. Direct Impacts: Direct impacts to grassland and oak savanna habitat in the Inner Coast Range Conservation Area (Figure 4-21) shall be mitigated through the preservation and management of foraging habitat at a ratio of 1:1 (mitigation-to-impact). Mitigation shall be provided in the Irrigated Agriculture, Valley Floor Grassland and Vernal Pool, or Inner Coast Range Potential Reserve Areas (Figure 4-27). Preservation of Inner Coast Range habitat may be satisfied through implementation of Measures RLF MIT 1 and CSB MIT 1 if the minimum 1:1 mitigation ratio for foraging habitat is achieved.</p> <p>2. Indirect Impacts: Indirect impacts to Swainson's hawk foraging habitat within 250 ft of development are covered under mitigation requirements for the California red-legged frog and Callippe silverspot butterfly protecting upland habitat within the Inner Coast Range Natural Community including Measures RLF MIT 1 and CSB MIT 1.</p> <p>3. Temporary Impacts: Temporary impacts to Swainson's hawk foraging habitat shall not require direct compensation provided all temporarily disturbed habitats shall be restored to original conditions within 1 year at a minimum 1:1 ratio.</p> <p>• Exceptions: Covered Activities that are likely to have minimal effects on the extent and quality of Swainson's hawk foraging habitat are exempt from Swainson's hawk foraging habitat mitigation requirements. Such activities include: activities related to establishment of natural habitats (e.g., aquatic, riparian, and grassland habitats), construction of infill developments on small, infill lots (less than 5 ac of contiguous habitat)¹⁰ and bordered by contiguous urban development at the time the HCP is adopted, and other minor public and private facilities accessed via existing roads or that impact less than 0.5 ac of potential Swainson's hawk foraging habitat (e.g., pump stations, antennae sites, new irrigation canals, buried pipelines, or utilities).</p>
SH MIT 4: Known Nest Trees	Covered Activities resulting in the take of a Swainson's hawk known or active nest site shall preserve an active nest site. Preservation of an active nest site may be achieved through purchase of occupied nest credits from an HCP-certified mitigation bank or approved project-specific reserve. If preserved active nest sites are unavailable, project proponents will provide funding to the HCP's Interim Nest Protection Program (see Objective SH 2.2 and Section 11.1.2).

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	<p>For the purposes of Mitigation Measure SH MIT 4, take of a known or active nest tree will occur if one of the following conditions is met:</p> <ol style="list-style-type: none"> 1. The Covered Activity directly removes the nest tree or involves soil compaction or grading (excavation or fill) within more than 25 percent of the root zone of the nest tree. The root zone may be determined by a qualified arborist but shall, at a minimum, be the greater of the horizontal distance from the tree at least equal to the tree's height or the outer edge of the tree canopy. 2. The Covered Activity affects the nest such that active Swainson's hawks are disturbed to a degree that causes, or is likely to cause: (a) injury to the nesting birds; (b) a decrease in productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or (c) nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior. Covered Activities within 250 ft of an active nest are presumed to have long-term effects on the nest. <p>Applicants affecting nests shall:</p> <ol style="list-style-type: none"> a. Directly comply with Measure SH MIT 4 nest preservation requirements (e.g., purchase of occupied nest credits from an HCP-certified mitigation bank or approved project-specific reserve); or b. Upon approval from SCWA and the Resource Agencies (see Section 10.4), the applicant will pay the current nest-protection impact fee and monitor the nest tree for a minimum of two nesting seasons following completion and occupancy of the project. If the nest remains active or is affected by a subsequent project, the fee, with applicable interest, will be returned to the applicant; or c. Demonstrate to and receive concurrence from SCWA and the Resource Agencies that the Covered Activity will not substantially increase disturbance to the nest site. <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Indirect effects described under Condition 2 above do not apply to Operation and Maintenance Covered Activities conducted in compliance with Avoidance and Minimization Measure SH CON 4: Active Nest Buffers. If such activities cannot be conducted in compliance with Measure SH CON 4, then the above requirements will apply.</p> <p>Measure SH MIT 4 will be accomplished through payment of fees and will be managed by SCWA through a process similar to that described under Objective SH 2.2, through targeted acquisition and conservation easements of suitable nesting habitat. Alternatively, project proponents may preserve known nest sites in Solano County subject to the requirements and approvals as specified in Section 10.5.</p>
SH MIT 5: Preservation of Important Nesting Habitat	Covered Activities in Zone 1 will provide funding (see Section 11.1.2) to contribute to targeted preservation through direct acquisition or conservation easement of 1,000 ac of nesting habitat for Swainson's hawk and burrowing owl in the Swainson's Hawk Irrigated Agriculture Potential Reserve Area (Figure 4-27).





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
BURROWING OWL	
BO MIT 1: Mitigation for Direct and Indirect Impacts to Foraging Habitat	<p>1. Direct Impacts: Mitigation for the direct disturbance, destruction, or conversion of burrowing owl habitat¹¹ for urban development or other permanent facilities shall be provided at a 1:1 ratio. Project sites that have been occupied during the nesting season at any time during the past 3 years or found to be nesting at the time of preconstruction surveys will be considered occupied by owls and require additional nesting habitat mitigation (see Measure BO MIT 2). All burrowing owl habitat affected directly by the project will be subject to the compensation requirement. Mitigation lands used to satisfy mitigation measures for other Natural Communities and/or Covered Species (i.e., Valley Floor Grassland and Vernal Pool Natural Community [excluding the wetland restoration/construction component], Coastal Marsh Natural Community, Swainson's hawk, California red-legged frog, and Callippe silverspot butterfly) can be used to satisfy burrowing owl conservation if the reserve area meets the basic burrowing owl reserve management standards (Sections 7.3 and 10.5.3) and criteria specified in Objective BO 1.2 (Section 5.10.1).</p> <p>2. Indirect Impacts: Indirect impacts to burrowing owl habitat from development in irrigated agriculture lands shall be mitigated through the preservation and management of foraging habitats at a ratio of 0.5:1. Indirect impacts in valley floor grassland habitat are covered under mitigation requirements for the Valley Floor Grassland and Vernal Pool Natural Community, including Measure VPG MIT 1 requirements. Indirect impacts in coastal marsh habitat are covered under mitigation requirements for the Coastal Marsh Natural Community, including Measure CM MIT 2 requirements. Indirect impacts in Inner Coast Range habitat are covered under mitigation requirements for the California red-legged frog and Callippe silverspot butterfly protecting upland habitat within the Inner Coast Range Natural Community, including Measures RLF MIT 1 and CSB MIT 1.</p> <ul style="list-style-type: none"> • Exemptions: Infill projects on small, infill lots (which are not part of undeveloped lands greater than 5 ac of contiguous habitat) and which are bordered by contiguous urban development (based on conditions at the time the HCP is adopted) would have minimal effects on the extent and quality of burrowing owl habitat and are exempt from burrowing owl foraging habitat mitigation requirements unless a known or active nest is present. Additionally, project proponents are obligated to avoid destruction of active burrowing owl nests and take of burrowing owls in compliance with the Federal MBTA and California Fish and Game Code Section 3503.5 and to meet the requirements specified in Avoidance and Minimization Measures BO CON 1, BO CON 2, and BO CON 3, and Mitigation Measure BO MIT 3.
BO MIT 2: Known Nest Sites	<p>Covered Activities resulting in the take of a known or active burrowing owl nest site shall preserve an active nest site. Preservation of an active nest site may be achieved through purchase of occupied nest credits from an HCP-certified mitigation bank or approved project-specific reserve. If preserved active nest sites are unavailable, project proponents will provide funding (\$25,000 per nest at 2016 costs) to the SCWA Interim Nest Protection Program (see Section 11.1.2).</p> <p>Mitigation Measure BO MIT 2 will be accomplished through payment of fees and will be managed by SCWA through a process similar to that described under Objective SH 2.2, through targeted acquisition and conservation easements of suitable nesting habitat. Alternatively, project proponents may preserve known nest sites in Solano County subject to the requirements and approvals specified in Section 10.5.</p>

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
BO MIT 3: Preservation of Important Nesting Habitat	Covered Activities in Zone 1 will provide funding (to be implemented in conjunction with Mitigation Measure SH MIT 5 and Section 11.1.2) to contribute to targeted preservation through direct acquisition or conservation easement of 1,000 ac of nesting and associated nest buffer for burrowing owl and Swainson's hawk in the Swainson's Hawk Irrigated Agriculture Potential Reserve Area (Figure 4-27).
BO MIT 4: Mitigation for Temporary Impacts	<p>If construction activities associated with development-related Covered Activities (e.g., grading, staging areas, but excluding restoration and reserve management activities) result in the loss of occupied nesting or wintering burrows¹² (e.g., closure, collapse due to ground disturbance, or disturbance in the construction buffer zones), mitigation shall be provided according to the following criteria at all times of the year:</p> <ol style="list-style-type: none"> Alternative Burrow Plan: Applicants shall provide an Alternative Burrow Plan for review and approval by SCWA and the Resource Agencies. The Alternative Burrow Plan shall include, but is not limited to, the following: <ol style="list-style-type: none"> An assessment of available suitable burrows within 330 ft of the edge of the construction area if suitable contiguous habitat remains. Provisions to install artificial burrows if suitable donor burrows are not present. A maintenance and monitoring program that includes a minimum of 2 years following completion of the project that resulted in the temporary impact. The maintenance program shall include provisions to maintain artificial burrows, if required, in usable condition and vegetation height at 6 inches or less within 50 ft of the burrows. If the above measures cannot be implemented because sufficient habitat is not present in surrounding, contiguous lands to support burrowing owls or at the applicant's discretion, temporary impacts shall be mitigated per the requirements of BO MIT 1 and BO MIT 2. Compliance with Mitigation Measure BO MIT 4 does not allow for the destruction or disturbance of an active nest site. Temporary Impacts: All temporarily disturbed burrowing owl habitats shall be restored to original conditions within 1 year at a minimum 1:1 ratio.
SPECIAL MANAGEMENT SPECIES	
No mitigation measures are required for these species	Special Management Species will receive substantial conservation benefit from implementation of the habitat preservation and restoration, water quality protection, invasive species control, and reserve management associated with the Conservation Strategies for Natural Communities and Covered Species described in Chapter 5.0. No additional direct mitigation requirements are required for these species.

¹ Additional conditions of this mitigation requirement for impacts to occupied Contra Costa goldfield habitat are described in Measure VPG MIT 3.

² Constructed habitats take time to mature and replace aquatic functions; this warrants a higher mitigation ratio in cases where a delay is planned between impacts and full replacement of functions. Restoration credits purchased from an approved mitigation bank or wetland restoration implemented prior to loss of wetland habitats that meet initial performance criteria (demonstration of adequate hydrology and plant establishment) are suitable for the 1:1 replacement ratio.

³ Suitable breeding habitat is defined as all natural vernal pool and man-made ponds that maintain standing water in most years for a minimum of 12 consecutive weeks.

⁴ Any breeding habitat within 500 ft of development will be considered to be indirectly impacted.

⁵ Suitable known breeding habitat shall include all known sites where California tiger salamander recruitment has been considered successful when the following criteria occur in normal to below normal rainfall years: the breeding sites exhibit suitable hydrology; larvae are at a stage of development where they are likely to survive to metamorphosis;





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	estimated recruitment is within the range of recruitment levels from other baseline years for the site; and/or estimated recruitment is within the range of or greater than recruitment from other sites in the region with available and comparable information.
⁶	Occupied breeding habitat shall include all known sites where California red-legged frog recruitment has been considered successful when the following criteria occur in normal to below normal rainfall years: the breeding sites exhibit suitable hydrology; larvae are at a stage of development where they are likely to survive to metamorphosis; estimated recruitment is within the range of recruitment levels from other baseline years for the site; and/or estimated recruitment is within the range of or greater than recruitment from other sites in the region with available and comparable information.
⁷	Design standards for all storm water-related mitigation measures shall conform to NPDES permit requirements in place at the time of the project approvals when such permit requirements exceed the minimum standards presented in the HCP.
⁸	Tricolored blackbird foraging habitat consists of the following: grain/hay crops, row crops and other irrigated agriculture, valley floor/vernal pool grassland, grassland and oak savanna within the Inner Coast Range, pasture, vacant or fallow fields, diked historical tidal wetlands within the Coastal Marsh Natural Community, and riparian habitat within the Riparian, Stream, and Freshwater Marsh Natural Community.
⁹	Indirect impacts are based on the location/conservation value of the impacted habitat, not on the location of the project activity.
¹⁰	For the purposes of this exemption, roads are not generally considered as development and contiguous habitat may include adjacent undeveloped lands on adjacent parcels.
¹¹	Burrowing owl habitat consists of the following: valley floor/vernal pool grassland, grassland and oak savanna within the Inner Coast Range, pasture, grain/hay crops, row crops and other irrigated agriculture, vacant or fallow fields, and diked historical tidal wetlands within the Coastal Marsh Natural Community.
¹²	Sites that have been occupied at any time during the past 3 years will be considered occupied by owls and require mitigation.

Abbreviations:

ac = acres

BMPs = Best Management Practices

CASQA = California Stormwater Quality Association

CDFW = California Department of Fish and Wildlife

Dixon RCD = Dixon Resource Conservation District

ft = feet

HCP = Habitat Conservation Plan

MBTA = Migratory Bird Treaty Act

mi = miles

MPWD = Maine Prairie Water District

NOAA NMFS = National Oceanic and Atmospheric Administration, National Marine Fisheries Service

NPDES = National Pollutant Discharge Elimination System

RD 2068 = Reclamation District No. 2068

RWQCB = Regional Water Quality Control Board

SCWA = Solano County Water Agency

sf = square feet

SID = Solano Irrigation District

SWRCB = State Water Resources Control Board

USFWS = United States Fish and Wildlife Service