



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	Amphibians: <ul style="list-style-type: none"> California tiger salamander Birds: <ul style="list-style-type: none"> Burrowing owl Invertebrates: <ul style="list-style-type: none"> Conservancy fairy shrimp Delta green ground beetle Vernal pool fairy shrimp Vernal pool tadpole shrimp 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 smallscale 	Birds: <ul style="list-style-type: none"> Swainson's hawk Tricolored blackbird 	Birds: <ul style="list-style-type: none"> Grasshopper sparrow Mountain plover Invertebrates: <ul style="list-style-type: none"> Ricksecker's water scavenger beetle 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 peppergrass Hispid bird's-beak Hogwallow starfish Pappose tarplant⁴ Recurved larkspur Saline clover San Joaquin spearscale 	Birds: <ul style="list-style-type: none"> Loggerhead shrike Northern harrier Short-eared owl Yellow-headed blackbird
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"> Swainson's hawk Burrowing owl Invertebrates: <ul style="list-style-type: none"> Valley elderberry longhorn beetle 		Amphibians: <ul style="list-style-type: none"> Foothill yellow-legged frog Birds: <ul style="list-style-type: none"> Yellow-breasted chat Loggerhead shrike Yellow-headed blackbird Reptiles: <ul style="list-style-type: none"> Western pond turtle
Riparian, Stream, and Freshwater Marsh	Birds: <ul style="list-style-type: none"> Tricolored blackbird Fish: <ul style="list-style-type: none"> Chinook salmon (fall run) Steelhead (Central Coast ESU) Steelhead (Central Valley ESU) 	Birds: <ul style="list-style-type: none"> Swainson's hawk Fish: <ul style="list-style-type: none"> Delta smelt Sacramento splittail Green sturgeon 	Amphibians: <ul style="list-style-type: none"> Foothill yellow-legged frog Birds: <ul style="list-style-type: none"> Yellow-breasted chat Modesto song sparrow Reptiles: <ul style="list-style-type: none"> Western pond turtle 	Birds: <ul style="list-style-type: none"> Loggerhead shrike Yellow-headed blackbird

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Natural Community	Covered Species		Special Management Species	
	Primary Species ¹	Secondary Species ²	Primary Species	Secondary Species
	Invertebrates: <ul style="list-style-type: none"> Valley elderberry longhorn beetle Reptiles: <ul style="list-style-type: none"> Giant garter snake 			
Coastal Marsh	Birds: <ul style="list-style-type: none"> California clapper rail California black rail Fish: <ul style="list-style-type: none"> Chinook salmon (winter run) Chinook salmon (spring run) Delta smelt Longfin smelt 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 Fish: <ul style="list-style-type: none"> Steelhead Chinook salmon (fall run) Green sturgeon 	Birds: <ul style="list-style-type: none"> Northern harrier Salt marsh common yellowthroat Short-eared owl Samuel's song sparrow Suisun song sparrow Mammals: <ul style="list-style-type: none"> Suisun shrew Plants: <ul style="list-style-type: none"> Delta mudwort Delta tule pea Hispid bird's-beak Rose mallow Suisun marsh aster 	Birds: <ul style="list-style-type: none"> Loggerhead shrike Yellow-headed blackbird Reptiles: <ul style="list-style-type: none"> Western pond turtle
Irrigated Agriculture	Birds: <ul style="list-style-type: none"> Swainson's hawk 	Birds: <ul style="list-style-type: none"> Burrowing owl Tricolored blackbird 		Birds: <ul style="list-style-type: none"> Loggerhead shrike Yellow-headed blackbird

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, their respective Natural Community is considered to be the primary Natural Community association for these covered species.

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, their respective Natural Community is *not* considered to be the primary Natural Community association for these covered species.

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

⁴ Replaced Cogdon's Tarplant.

ESU = Evolutionarily Significant Unit





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 Valley Floor Grassland and Vernal Pool ecosystem resiliency.	<p>Objective VPG 1.1: Preserve 13,000 to 15,000 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:</p> <ul style="list-style-type: none"> • 380 to 400 ac in Subarea 1B, • 700 to 760 ac in Subarea 1C, • 60 ac in Subarea 1D, • 170 ac in Subarea 1E, • 120 ac in Subarea 1G, • At least 350 ac in Subarea 1F, and • 11,140 to 13,220 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 4-6).</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 to 500 ac of contiguous upland habitat that will allow unobstructed movement between breeding sites and upland burrow sites. • Priority shall be given to establishing reserves that connect existing reserves or that restore habitat between existing reserves in Vernal Pool Conservation Areas 1F and 2F (the Potrero Hills/SR-12 region), Vernal Pool Conservation Area 1A (the Greater Jepson Prairie region), and Vernal Pool Conservation Areas 1C and 1D (northeast Fairfield region) (see Objective VGP 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 and create new, suitable, California tiger salamander breeding habitat at a 3:1 (mitigation-to-impact) ratio for impacted breeding habitat. Additional breeding habitat shall be provided at a ratio of 0.0035 ac per acre⁶ of California tiger salamander upland habitat. 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: Re-establish 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.	Objective RLF 1.1: Preserve and/or actively manage 3,100 ac of upland, riparian, and aquatic habitats within the California Red-Legged Frog Conservation Area in perpetuity for the benefit of California red-legged frogs.
	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 impacts to suitable breeding habitat from Covered Activities.
	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.
	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.
	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.
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.	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 3,100 ac of Inner Coast Range habitats to be acquired under Objective RLF 1.1 (Section 5.4.1).
	Objective CSB 1.2: Increase the quantity and quality of breeding habitat and adult nectar sources for callippe silverspot butterfly within the Callippe Silverspot Butterfly Conservation Area.
	Objective CSB1.3: 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.
	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.

Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
RIPARIAN, STREAM, AND FRESHWATER MARSH	
<p>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>	<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 and adopt 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 Regulatory 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 Ulatis 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>
<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 re-colonization in restored areas.</p>	<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 streams: Jameson Canyon, Lynch Canyon (a.k.a. American Canyon), Ledge wood, Suisun Valley, and Green Valley Creeks and their tributaries that contain suitable breeding and rearing habitat for steelhead and salmon.</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 along Jameson Canyon, Lynch Canyon, Ledge wood, Suisun Valley, and Green 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, Ulatis, Green Valley, Suisun Valley, Ledge wood, and Putah Creeks and other creeks supporting extant valley elderberry longhorn beetle populations by replacing impacted elderberry plants 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> <p>Objective RSM 2.5: Preserve one known tricolored breeding site with a similar sized breeding population for each known breeding colony affected by development. SCWA, in consultation with the Resource Agencies (see Section 10.2.6), will implement interim measures to protect active and known colonies until such time as the HCP reserve</p>





Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
	system supports a number of breeding colonies equal to or greater than the number lost as a result of development activities.
GIANT GARTER SNAKE	
Goal GGS 1: Promote actions to re-establish 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.	<p>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. Funding for these programs shall be sufficient to control invasive species on 100 to 170 ac of coastal marsh habitat annually (or 5,000 to 8,500 ac in Delta waterways and Suisun and Napa River Marshes over the life of the HCP) and to fund cost-sharing of water quality improvement measures for discharges from municipal and agricultural sources. This objective shall be implemented in conjunction with Objective CM 1.1.</p> <p>Objective GGS 1.2: Acquire, enhance, and manage 85 ac of aquatic and 22 ac of associated upland habitat for giant garter snake as mitigation for unavoidable impacts from routine operational and maintenance activities.</p> <p>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.</p>
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.	<p>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 and improve water quality. Funding for these programs shall be sufficient to control invasive species on 170 to 280 ac of coastal marsh habitat annually (or 5,000 to 8,500 ac over the life of the HCP) and to fund cost-sharing of water quality improvement measures for municipal and agricultural water discharges.</p> <p>Objective CM 1.2: Plan Participants shall prevent increases over baseline conditions (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.</p>
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.	<p>Objective CM 2.1: Preserve, manage, and restore 80 ac of coastal brackish marsh habitats. 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.</p> <p>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.</p> <p>Objective CM 2.3: Plan Participants shall establish at least one new self-reproducing occurrence of Suisun thistle and soft bird's-beak.</p> <p>Objective CM 2.4: Contribute to increasing food production and habitat quality for 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).</p>

Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
SWAINSON'S HAWK	
<p>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 21,210 ac of Swainson's hawk habitat in Swainson's Hawk Potential Reserve Areas.</p>	<p>Objective SH 1.1: Preserve and manage in perpetuity a minimum of 5,970 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 (5) 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 13,000 to 15,000 ac of Valley Floor Grassland habitat to promote Swainson's hawk foraging and nesting opportunities within Swainson's Hawk Valley Floor Grassland Potential Reserve Areas. 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 3,300 ac of grassland and oak savanna to promote Swainson's hawk foraging and nesting opportunities within the Inner Coast Range Potential Reserve Areas.</p>
<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>	<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 Natural Community Reserve Area by preserving and replacing suitable nest trees within current and historic homesteads and restoring riparian habitats.





Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
	<ul style="list-style-type: none"> Ten suitable nest trees/groves per 320 ac of reserve (estimated to be 3 trees/groves) in the Inner Coast Range Natural Community Reserve Area. <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 10.2.6), 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"> 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. All acquired lands will be preserved and managed consistent with the reserve management requirements in Section 10.5. 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 5,970 ac of agricultural lands and annual grassland within the Swainson's Hawk Irrigated Agriculture Potential Reserve Areas. 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 13,000 to 15,000 ac of valley floor grassland habitat to promote foraging and nesting opportunities within the Swainson's Hawk Valley Floor Grassland Potential Reserve Areas. This objective will be implemented concurrently with Objective VPG 1.1.</p> <p>Objective BO 1.3: Preserve and manage 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.	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, defined term contracts or agreements, and conservation easements of known active nesting habitat.

Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
	<p>Objective BO 2.2: Install, monitor, and maintain at least 70 burrow complexes (minimum 3 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 5 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> <ol style="list-style-type: none"> 1. 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). 2. 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. 3. 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"> 1. 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. 2. 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). 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 3 artificial burrow complexes per 280 ac of reserves shall be installed, monitored, and maintained until sufficient





Table S.2: Conservation Strategy Goals and Objectives

Goals	Objectives
	<p>burrow density is achieved. Artificial burrow complexes shall be provided at a rate of 3 multi-entrance nest burrow/chambers and 9 temporary burrows per 280 ac of reserves until suitable, natural burrow densities reach a minimum of 28 burrows per 280 ac.</p> <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 (one breeding season or less). Where natural burrows do not occur in sufficient density, artificial burrows shall be provided.</p>

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 re-establish 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 effected 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 2005a) 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 (2005) have identified ponds in the range of 0.35 ac as being desirable to maximize potential for retaining a viable population for a 350 ac preserved area. The additional breeding habitat ratio of 0.0035 ac per acre of impacted upland habitat in combination with upland habitat mitigation requirements (see Section 6.4.2.2) is designed to achieve this amount of additional breeding habitat for 350 ac of preserved upland habitat.

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 1 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).

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

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 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; and 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 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 10.2.4 and 10.2.6).</p>
VPG 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 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 3 and VPG 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. 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). 6) Minimize the potential for spread of invasive species from the development into preserved lands.





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<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 specific in Avoidance and Minimization Measure VPG 6, Corridors.</p> <p>2. Contra Costa Goldfield Core Population Areas (High Value Vernal Pool Conservation Areas 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 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> <ol style="list-style-type: none"> 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). 2. Buffers shall not contain any irrigated or landscaped lands, fire breaks, or public or maintenance access trails or roads. 3. Habitats (vernal pools, uplands, etc.) within 250 ft of development in High and Medium Conservation Value Areas and 100 ft in Low Value Conservation Areas (Figure 4-8) (see potential exceptions below under Avoidance and Minimization Measure VPG 5 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. 4. Buffers shall be preserved in perpetuity and managed consistent with the reserve criteria described in Sections 7.3 and 10.5.
VPG 4: Protection and Buffer Zones for Extremely Rare and/or Range-Limited Species	<p>Populations of the following Covered Plant 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, and Ferris's milk-vetch. 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 for long-term management of these areas consistent with the reserve management and approval requirements described in Sections 7.3 and 10.5.3.</p>
VPG 5: Design Measures for New Roads	<p>New roads or expanded existing roads meeting the following criteria shall include measures to accommodate movement by California tiger salamanders and other small animals, and to maintain hydrological connectivity for covered vernal pool crustacean 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). 2. The new or expanded road has a design traffic volume of 20 cars per hour or greater at maximum capacity.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<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 (or 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 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 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 7: Best Management Practices to be Implemented During 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 CDFG within 24 hours of notification. 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. 2. Habitat Protection During Work Activities <ol style="list-style-type: none"> 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. b. 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 base of the fence will be buried in the ground to prevent animals





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>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. 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 on high visibility 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 Maintenance</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 vernal pools and 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 either side of the pool ("No Disk" zone) to warn the disk operator of the presence of habitat from either 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 a pool or if the soil is wet. In such cases, the operator must raise the disk blades and make a detour around the pool. Operators shall consult a site map, if available, to determine the best route around a pool/wetland area. 4) Where "No Disk" zones fuel levels in vernal pools 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.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<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 the firebreak routes while avoiding the endangered 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.
CALIFORNIA RED-LEGGED FROG	
RLF 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; and 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 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).</p>
RLF 2: Aquatic Habitat Buffers and Corridors	<p>For aquatic habitat identified in Avoidance and Minimization Measure RLF 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 habitat⁴ and urban development/active open space recreation areas to protect aquatic breeding habitats to the maximum extent





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>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.</p> <p>2. Corridors shall connect avoided aquatic habitat to other suitable aquatic habitat within 0.7 mi. Corridors shall have the following minimum dimensions:</p> <ul 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 3: Design Measures for New Roads	<p>New roads or the expansion of existing roads with a projected night-time traffic volume of more 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 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>
RLF 4: Best Management Practices to be Implemented During Operation, Maintenance, and Construction Activities.	<p>1. Biological Monitor</p> <ul 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 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) who is 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. <p>2. Habitat Protection and Take Avoidance During Work Activities</p> <ul style="list-style-type: none"> a. Exclusion fencing shall be installed 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 at least 3 ft in height. The base of the fence will be buried in the ground 3 to 5 inches 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. The fence will be pulled taut at each support to prevent folds

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>or snags and the supports shall be placed on the inside of the exclusion fence. 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 high visibility materials. Exclusion fencing shall be inspected weekly and repaired immediately when damage is observed during construction work.</p> <p>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.</p> <p>3. Pre-Construction 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 USFWS and CDFG.</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 site⁵.</p>





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	7. Site Restoration 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 pre-work topography and hydrology. Disturbed areas shall be reseeded, if necessary, using local, native, noninvasive species seed mixes. All such restoration work shall be conducted under the supervision of an Approved Biologist.
CALLIPPE SILVERSPOT BUTTERFLY	
CSB 1: Site Design Standards in Callippe Silverspot Core Breeding Habitat	The following site design standards shall apply where core breeding habitat occurs: <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. Occupied habitat shall be determined based on a minimum of one season of field surveys/mapping at the 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. 5. All avoided breeding habitat shall have natural corridors at least 300 ft wide that are oriented along hilltops and ridgelines. All avoided breeding habitat and associated corridor areas shall be preserved in perpetuity and managed consistent with the reserve criteria described in Sections 7.3 and 10.5. 6. All avoided areas, including buffer areas, shall be preserved and managed consistent with the requirements described in Section 7.3 and 10.5.
CSB 2: Best Management Practices to be Implemented During 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 larval host plant 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 high visibility materials. Exclusion fencing shall be inspected and repaired on a weekly basis during construction work.
RIPARIAN, STREAM, AND FRESHWATER MARSH	
RSM 1: Habitat Avoidance	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:

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"> 1. Riparian, stream, and associated buffer habitats located in Priority Drainages and Watersheds (Figure 4-10) 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 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 10.4.2). 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 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 projects⁶, 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 historic 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. 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.





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"> 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. 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. For those projects that involve reconstruction/restoration of channelized streams (including both widening of riparian corridors and re-establishment 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. Buffers shall be preserved in perpetuity and managed consistent with the reserve criteria described in Sections 7.3 and 10.5.2.
RSM 3: Riparian Tree Protection	<ol style="list-style-type: none"> 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. 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. An air spade or the equivalent shall be used to aerate and loosen the soil in the structural root zone of native riparian trees to minimize physical injury to the tree roots. Branch or root pruning of native riparian trees, if required, shall be conducted under the supervision of a Certified Arborist. 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. Fill, gravel, or other construction materials shall not be stockpiled in the drip lines of native riparian trees.
RSM 4: Best Management Practices to be Implemented During all Operation, Maintenance, and Construction Activities	<ol style="list-style-type: none"> Habitat Protection During Work Activities <ol style="list-style-type: none"> 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 re-establish riparian vegetation in accordance with Section 6.4.5. Exclusion fencing shall be installed 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. 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

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>of the exclusion fence to increase visibility unless the exclusion fence is composed of high visibility materials. Exclusion fencing shall be inspected and repaired on a weekly basis during construction work.</p> <p>2. Firebreak Construction and Maintenance</p> <p>a. To the maximum extent practicable, fire breaks 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.</p> <p>b. If fuel breaks are needed in a stand of riparian woodland vegetation, the following measures shall apply to the maximum extent practicable⁷:</p> <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. <p>3. Dewatering Activities</p> <p>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.</p> <p>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 unaffected by the work or downstream of the work area⁵. All nonnative invasive species shall be captured, removed from the project site, and humanely euthanized.</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>e. If coffer dams are used, turbid water pumped out of the dam shall not re-enter the channel until the sediment has settled out to prevent any increase in turbidity in downstream waters.</p> <p>4. Work Timing</p> <p>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 California Red-Legged Frog and Giant Garter Snake Conservation Areas (Figures 4-14 and 4-18), in steelhead streams (Figure 4-17), or where more restrictive time frames to protect nesting birds and other Covered and Special Management Species may apply.</p>





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>5. Habitat Protection and Site Restoration</p> <ol style="list-style-type: none"> 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. Streambed and bank construction work shall not create any physical barriers to fish migration such as artificial berms or a uniformly flat channel profile. Bank stabilization projects shall also incorporate bioengineering techniques and other measures to promote re-establishment 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. 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. Excess drainage from the construction site shall be routed away from riparian, stream, and freshwater marsh habitats. 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. 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. 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.
RSM 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 Valley Creek, Ledgebrook Creek, Gordon Valley Creek, Lynch Canyon Creek, Jameson Canyon Creek, Putah Creek, and the Napa River (Figure 4-17).</p> <ol style="list-style-type: none"> 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. 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. 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. 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.

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. 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. 11. Conduct cleaning activities in designated salmonid habitat (see Chapter 4.0; Figure 4-17) during an appropriate work window when salmonids are less likely to be present (e.g., June 15 through October 31). 12. Have a qualified fishery biologist 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 CDFG and the 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. The following measures shall be implemented with respect to pile driving: <ol style="list-style-type: none"> a. A vibratory driver is acceptable for any size pile. A diesel impact hammer is acceptable for 12-inch-diameter piles and is less subject to the performance standards below. b. Piles over 12 inches in diameter shall be driven into the streambed with a vibratory driver. Accumulated SELs shall not exceed 187 dB measured at 33 ft for all listed fish, except those that are 0.07 ounce. SELs for fish weighing 0.07 ounce or less shall not exceed 183 dB measured at 33 ft. c. When using a diesel impact hammer, maintain the cumulative SEL below 183 dB, and use a vibratory driver to the greatest extent possible before utilizing the diesel impact hammer. d. Where practicable, start pile driving at a lower decibel level to stimulate avoidance behavior in fish and allow the fish time to vacate the area, then ramp up the pile driving (limiting the maximum noise level to Measure 16.b above) to complete the pile driving faster. e. The preferred work window for pile driving is from August 1 through November 30. f. If these measures cannot be implemented, additional project-specific measures may be proposed and implemented subject to review and written approval from SCWA and the Resource Agencies.





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
RSM 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 plants⁸:</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: "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." 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, 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 with 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. 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. 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. 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

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>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>
<p>RSM 7: Tricolored Blackbird</p>	<p>The following measures are for Covered Activities that are within 250 ft of suitable tricolored blackbird breeding habitat:</p> <ol style="list-style-type: none"> 1. During the breeding season (February 1 through August 31), an Approved Biologist shall conduct pre-construction 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; (d) silage and other grain fields such as sorghum. <p>Pre-construction 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 pre-construction 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> <ol style="list-style-type: none"> 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: <ol style="list-style-type: none"> 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. 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). c. Additional monitoring shall be required any time there is a change in heavy equipment use or activity that results in greater noise levels. d. Monitoring is continued at least once a week through the nesting cycle until the young have fledged and left the nest area. e. Monitoring reports are submitted to SCWA. 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.
Giant Garter Snake	
<p>GGG 1: Timing of Work</p>	<p>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.</p>



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

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
GGs 2: Best Management Practices to be Implemented During all Operation, Maintenance, and Construction Activities	<ol style="list-style-type: none"> 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. 2. 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. 3. 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. To maintain cover for garter snakes next to a canal, opposite banks shall be mowed on alternate years. 4. All workers shall receive training from the Approved Biologist on how to recognize a giant garter snake and its habitat(s). 5. Twenty-four (24) 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. 6. 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. 7. Gas cartridge rodenticides will not be used to fumigate burrows in areas supporting giant garter snake between October 1 and April 30. 8. Plastic monofilament or wire mesh straw waddles 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.
Coastal Marsh	
CM 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 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 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 7.2 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 3: Best Management Practices to be Implemented During all Operation, Maintenance, and Construction Activities	<ol style="list-style-type: none"> 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. 2. Soil excavated in the root zone of emergent wetland vegetation shall be salvaged and stockpiled to the maximum extent practicable for restoration of disturbed wetland sites.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>3. 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 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. 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 material. Exclusion fencing shall be inspected and repaired on a weekly basis during construction work. Exclusion fencing shall be installed and maintained around the edges of a work area adjacent to any aquatic habitat during all work activities.</p> <p>4. An Approved Biologist shall be present at the work site until the construction barrier fencing is installed, instruction of workers has been conducted, and direct habitat disturbance has been completed. After that time, the contractor or permittee shall designate a person to monitor on site compliance with all minimization measures. The monitor and Approved Biologist shall have the authority to halt any action that might result in impacts that exceed anticipated levels.</p> <p>5. 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 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 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 Operations 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 6: Salt Marsh Harvest Mouse	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 as well as suitable upland refuge habitat for salt marsh harvest mouse. For development activities adjacent to suitable habitat, the requirements of Avoidance and Minimization Measure CM 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).





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<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. All vegetation will be removed from the construction area. Vegetation removal will be conducted using hand-held tools in a manner that enables and encourages wildlife to escape from the construction area. Vegetation shall only be removed with non-mechanized hand tools (i.e. trowel, hoe, rake, scissors, and shovel). No motorized equipment, including string trimmers or lawn mowers, shall be used to remove this vegetation. Vegetation will be removed to bare ground. Vegetation shall be removed under the supervision of an SCWA/Resource Agencies' Approved Biologist. If a mouse of any species is observed in areas where vegetation is being removed, SCWA and the Resource Agencies shall be notified. Vegetation removal may begin when no mice are observed and shall start at the edge farthest from the salt marsh or the poorest habitat and work its way toward the marsh or the better marsh habitat. 2. To prevent salt marsh harvest mice from moving through the construction area, temporary exclusion fencing will be placed immediately after the vegetation removal and prior to the start of any other construction activities. The temporary exclusion fencing should be made of a heavy plastic sheeting material that does not allow salt marsh harvest mice to pass through or climb, and the bottom should be buried to a depth of 2 inches so that these species cannot crawl under the fence. Temporary exclusion fencing height will be at least 12 inches higher than the highest adjacent vegetation, to a maximum height of 4 ft. Temporary exclusion fencing will be removed after all construction between the Union Pacific Railroad tracks and the marsh is complete. 3. The Approved Biologist will be on site during all construction activities, including vegetation removal and the installation of the temporary exclusion fencing. The Approved Biologist will look for listed species during all construction activities and will document compliance with the project permit conditions and avoidance and conservation 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 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, 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 the SCWA and the Resource Agencies within 1 working day via electronic mail and telephone following any encounters, inadvertent killing, or injury of a potential salt marsh harvest mouse during construction. 4. 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. 5. Prior to the start of daily construction activities in salt marsh harvest mouse habitat, the Approved Biologist will inspect the temporary exclusion fencing to ensure it is neither ripped nor has holes in it and the base is still buried. The fenced area will also be inspected to ensure 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. 6. All disturbed areas shall be restored to the pre-project topographic and hydrologic conditions. A reclamation plan to restore vegetation to pre-disturbance or better conditions for the salt marsh harvest mouse shall be developed, reviewed, and approved by SCWA and the HCP Technical Advisory Committee, 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 7: Delta Smelt, Longfin Smelt, Green Sturgeon, 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 Advisory Committee (see Section 10.2.6), and compliance with requirements for mitigation (see Section 6.4.7). 2. Dredged material shall not be placed on aquatic vegetation. 3. Dredging or excavation shall be conducted only during low-flow periods. 4. Silt-trapping devices shall be used to minimize downstream sedimentation. 5. The use of rock riprap in low-flow channels shall be avoided to the maximum extent practicable. 6. The following measures shall be implemented with respect to pile driving: <ol style="list-style-type: none"> a. A vibratory driver is acceptable for any size of pile. A diesel impact hammer is acceptable for piles that are 12 inches in diameter or less and subject to the performance standards below. b. Piles over 12 inches in diameter shall be driven into the streambed with a vibratory driver. Accumulated SELs shall not exceed 187 dB measured at 33 ft for all listed fish, except for those that are 0.07 ounce. SELs for fish weighing 0.07 ounce or less shall not exceed 183 dB measured at 33 ft. c. When using a diesel impact hammer, maintain the cumulative SEL below 183 dB and use a vibratory driver to the greatest extent possible before utilizing the diesel impact hammer. d. Where practicable, start pile driving at a lower decibel level to stimulate avoidance behavior in fish, allow the fish time to vacate the area, and then ramp up the pile driving (limiting the maximum noise level to Measure 6.b above) to complete the pile driving faster. e. The preferred work window for pile driving is between August 1 and November 30. 7. If these measures cannot be implemented, additional project-specific measures may be proposed and implemented subject to review and written approval from SCWA and the Resource Agencies.
CM 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 pre-construction 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. 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.





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"> 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, in consultation with the HCP Technical Advisory Committee, 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. If California clapper rail and California black rail are identified, a 700 ft buffer shall be maintained for Covered Activities between February 1 and August 31. Buffer zones may be reduced if it can be demonstrated to the satisfaction of SCWA, in consultation with the HCP Technical Advisory Committee, that the birds would be unaffected by project-related activities. No buffers shall be required between September 1 and January 31. Construction activity between September 1 and January 31 shall be conducted only when high tides are not at their winter or summer extremes to reduce the likelihood that California clapper rails will be present in the work area. Construction next to the marsh shall be avoided during the highest tides of December and January (± 1 week each month). 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.
SWAINSON'S HAWK	
SH 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 2: Solano Irrigation District 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"> Commercial feedlots, which are defined as any open or enclosed area where domestic livestock are grouped together for intensive feeding purposes; Horticultural specialties, including sod, nursery stock, ornamental shrubs, ornamental trees, Christmas trees, or flowers; Commercial greenhouses or plant nurseries; Commercial aquaculture of aquatic plants, animals, and their byproducts; Planting orchards or vineyards for the production of fruits, nuts, or berries except in designated farmstead areas; and

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	<p>6. Cultivation of perennial vegetable crops such as artichokes and asparagus, as well as annual crops such as cotton or rice.</p> <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 3: Pre-Construction Nest Surveys	Between March 1 and August 31 ⁹ , an Approved Biologist shall conduct pre-construction surveys to identify and subsequently avoid nesting areas for Swainson's hawk. Surveys shall be conducted within 15 days of the anticipated start of construction, and shall be designed and of sufficient intensity to document nesting within 0.25 mi (1,320 ft) of planned work activities. If a lapse in project-related construction work of 15 days or longer occurs, additional pre-construction surveys shall be required before project work may be reinitiated.
SH 4: Active Nest Buffers	<p>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 re-nesting activity). Nest trees may be removed between September 16 and February 1 when nests are unoccupied.</p> <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 activities¹⁰ (e.g., the nest is located in an area where the hawks are habituated to human activity and noise levels comparable to anticipated construction work). SCWA, in consultation with the HCP Technical Review Committee, 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. 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>
SH 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 4 documents that adverse effects will not occur.





Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
BURROWING OWL	
BO 1: Pre-Construction Surveys	Between February 1 and August 31, an Approved Biologist shall conduct pre-construction surveys in known or suitable habitat areas to identify and subsequently avoid nesting areas for burrowing owls. Surveys shall be conducted within 15 days of the anticipated start of construction, and shall follow standard Solano HCP protocols ¹¹ . If a lapse in project-related construction work of 15 days or longer occurs during the nesting season, additional pre-construction surveys shall be required before project work may be reinitiated.
BO 2: Exclusion	If burrowing owls or suitable nesting habitat are identified on site during the initial pre-application 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 3: Construction Buffers and Exclusion	<p>If Avoidance and Minimization Measure BO 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"> 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. If a buffer cannot be established (except as provided below), burrowing owls shall be evicted from the entire construction area using passive relocation techniques. One-way doors shall be installed in all suitable burrows, left in place for a minimum of 48 hours, and monitored daily to evaluate owl exclusion and to ensure doors are functioning properly. Burrows shall then be excavated, using hand tools whenever possible, and refilled to prevent reoccupation. Sections of flexible plastic pipe shall be inserted into burrows during excavation to maintain an escape route for any animals inside the burrow. 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 1 above. 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 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. 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. 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 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. Monitoring reports are submitted to SCWA.

Table S.3: Avoidance and Minimization Measures

Avoidance and Minimization Measure No. and Title	Avoidance and Minimization Measure Description
	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.
BO 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 in consultation with the HCP Technical Review Committee. Active relocation may be used on sites 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 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, in consultation with the HCP Technical Review Committee. 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 1: Preconstruction Surveys	In Valley Floor Grassland and Vernal Pool, Coastal Marsh, and Riparian, Stream, and Freshwater Marsh Natural Communities, pre-construction 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 passerine and within 500 ft of planned work activities for raptors. These surveys may be concurrently conducted with surveys for Covered Species.
SMS 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> <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).



**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"> Regular monitoring is continued through the nesting/wintering cycle at that site, and no change in nesting bird behavior is observed. 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 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 4).
SMS 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 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"> 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. 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 Riparian, Stream, and Marsh habitats (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 footnotes are provided on the following page.

Table S.3: Avoidance and Minimization Measures

Footnotes:

- 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 CDFG 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 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).
- ⁵ Transportation of exotic wildlife, without appropriate permits, is prohibited under California Fish and Game Code.
- ⁶ For the purposes of this measure, an infill project must be 5 ac or less in size and be located between two adjacent developments bordering the stream channel (one upstream and one downstream).
- ⁷ These measures do not apply to elderberry trees and shrubs. See Avoidance and Minimization Measure RSM 7 for measures applicable to fuel breaks in the vicinity of elderberry.
- ⁸ 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.
- ⁹ 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.
- ¹⁰ 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).
- ¹¹ SCWA will maintain lists of Approved Biologists and current preconstruction survey protocols. In general, preconstruction protocols require multiple surveys timed to maximize potential for observing target species.

ac = acres

BMPs = Best Management Practices

CDFG = California Department of Fish and Game

dB = decibels

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 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 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. 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. 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 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 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 within 250 ft of proposed development. 2. Medium Value 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. b. Wetland Component Indirect Impacts: Preserve vernal pool and swale habitats at a ratio of 1:1 for avoided wetlands within 250 ft of proposed development. c. Upland Component Direct Impacts: In Subareas 2C, 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. d. Upland Component Indirect Impacts: Preserve avoided upland habitat at a ratio of 1:1 within 250 ft of proposed development. 3. Low Value Conservation Areas and Seasonal Wetlands in Agricultural Areas of the County Outside of a Medium Value Conservation Area (Subarea 3, Figure 4-8)²

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	<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.</p> <p>b. Wetland Component Indirect Impacts: Preserve vernal pool and swale habitats at a ratio of 1:1 within 100 ft of proposed development.</p> <p>The mitigation ratios described above are 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>
VPG 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 1.</p> <p>1. Seasonal Wetland Categories</p> <p>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.</p> <p>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; often referred to as playa-type pools).</p> <p>c. Swales or Mesic Grassland: Shallow, standing water (generally less than 1 inch) present for fewer than 10 continuous days.</p> <p>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> <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> <p>1. Adequate funding (to be determined by SCWA) may be placed in a special fund to purchase applicable habitats when they become available; or</p> <p>2. Purchases of other mitigation types or categories may be substituted if the subject habitats are occupied by impacted Covered Species; or</p> <p>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>





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	Under Mitigation Measure VPG 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).
VPG 3: Mitigation for Impacts to Occupied Contra Costa Goldfield Habitat	<p>All direct impacts to extant stands of Contra Costa goldfields in identified Core Areas and Potential Habitat Areas (Figure 4-5) 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 in protected habitat areas. The occupied habitat preservation component can be done concurrent with the requirements of Mitigation Measure VPG 1 (i.e., the 9:1 preservation is concurrent with, 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. 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, vernal pool tadpole shrimp, and mid-valley 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 Areas (Figure 4-5). New populations must be established in currently unoccupied habitat. 5. Re-established populations will be considered self-reproducing when: <ol style="list-style-type: none"> a. Plants re-establish 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 percent⁵. 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 4: Mitigation for Impacts to California Tiger Salamanders and Their 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 Mitigation Measure VPG 2, subject to the following additional requirements.</p> <ol style="list-style-type: none"> Breeding Habitat Mitigation: Direct and indirect⁴ impacts to all suitable California tiger salamander breeding habitat⁵ in the known or potential range of the species (Figure 4-6) will be mitigated by preserving known breeding habitat at a 3:1 ratio and creating new breeding habitat at a ratio of 2:1 or 0.35 ac, whichever is greater. 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 2,100 ft of known breeding habitat⁶. <ol style="list-style-type: none"> All new breeding habitat shall be located within 2,100 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. New breeding habitat can consist of multiple sites within 1,300 ft of each other. All new created breeding habitats shall be 0.2 ac to 0.35 ac in size unless otherwise approved by SCWA and the Technical Advisory Committee. 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 Mitigation Measure VPG 2 for Subareas 1A, 1C through 1F, 1I through 1L (3:1 ratio) and Subareas 1G and 1H, 2C, 2F, and 2I (2:1 ratio), subject to the following additional conditions: <ol style="list-style-type: none"> All upland mitigation preservation shall be within 2,100 ft of known breeding habitat or within 1,300 ft of constructed breeding habitat if the constructed breeding habitat is within 2,100 ft of known breeding habitat. New breeding habitat shall be established at a ratio of 0.001 ac per acre of upland impacted by a project. 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). <p>Impacts to upland habitat within the potential range of the species (Figure 4-6), connecting Subareas 1B, 2B through 2E, 2G, 2H, and 2J through 2N, shall be mitigated by:</p> <ol style="list-style-type: none"> Preserving upland habitat at a 2:1 ratio and creating 0.001 ac of breeding habitat per acre of upland habitat impacted.
VPG 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 to contribute 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 in-stream barriers. Costs shall be calculated on a per-acre basis of new or increased impervious surface.</p>





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	<p>NOTE</p> <p>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 1: Mitigation for Permanent 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). 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.
RLF 2: Mitigation for Long-Term Impacts ⁷ to Riparian, Stream, Pond, and Freshwater Marsh Habitats in California Red-Legged Frog Conservation Areas	<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 Riparian, Stream, and Freshwater Marsh Mitigation Measure RSM 2, but subject to the following conditions:</p> <ol style="list-style-type: none"> Long-Term Impacts to Aquatic Breeding Habitat: Impacted breeding habitat shall be mitigated by preserving existing occupied breeding habitat at a 2:1 ratio and constructing new breeding habitat at a minimum 2:1 ratio. If suitable 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). Suitable breeding habitat consists of all standing bodies of fresh water (with salinities less than 7.0 ppt), including: natural and man-made (e.g., stock) ponds, slow-moving streams or pools in 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). 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. Long-Term 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 the features shall also be provided, including control of invasive plant and animal species (i.e., bullfrogs, pepperweed).

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
RLF 3: Temporary ⁸ Impacts to Upland, Marsh, Pond/Aquatic, and Riparian Habitats	<p>Temporary or short-term impacts associated with soil disturbance and removal of vegetation for ordinary channel operation and maintenance or other temporary construction 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 ratios specified in Mitigation Measure RSM 1 and all work is conducted with specified work windows and conditions under Avoidance and Minimization Measure RLF 5 (Section 6.3.3).</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 Mitigation Measure RLF 1 for uplands and Mitigation Measure RLF 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 4: Mitigation for 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 ratio (acres restored to acres impacted) consistent with Riparian, Stream, and Freshwater Marsh Mitigation Measure RSM 2, and provide an endowment fund or other approved funding source to implement management plans for preserved lands in perpetuity consistent with Sections 7.3 and 10.5.
RLF 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 (i.e., 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.
CALLIPPE SILVERSPOT BUTTERFLY	
CSB 1: Non-Breeding Habitat in the Callippe Silverspot Conservation Area	To mitigate for conversion of non-breeding habitats in the Callippe Silverspot Butterfly Conservation Area, suitable habitat shall be preserved and managed at a 3:1 ratio. All habitat preservation shall occur in the Callippe Silverspot Butterfly Conservation Area. All preserved lands shall meet the management and funding requirements identified in Sections 7.3 and 10.5. This measure shall be implemented concurrently with Mitigation Measure RLF 1.





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
CSB 2: Mitigation for the Conversion of Breeding Habitat	<p>Impacts to core viola larval host plant stands, adult nectar sources, and associated buffer habitats in the Callippe Silverspot Butterfly Conservation Area shall meet the following mitigation requirements:</p> <ol style="list-style-type: none"> Preservation Component: Mitigation for direct and indirect impacts to known or potential breeding habitat shall be provided as described below. 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 (6:1 total) 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. 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 (4.5:1 total) with preservation of known occupied habitat in the Callippe Silverspot Butterfly Conservation Area. <p style="text-align: center;">NOTE</p> <p style="text-align: center;">Habitat mitigation for temporary impacts within 300 ft of breeding habitat is not required if Covered Activities are conducted consistent with Avoidance and Minimization Measure CSB 2, all impacted habitat is successfully revegetated in one growing season, and restored habitat is preserved and managed consistent with the requirements provided in Sections 7.3 and 10.5.</p> <ol style="list-style-type: none"> Restoration Component: Both direct and indirect (within 300 ft) impacts to core viola larval 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.
RIPARIAN, STREAM, AND FRESHWATER MARSH	
RSM 1: Permanent Impacts to Riparian, Stream, and Freshwater Marsh Habitat	<p>Mitigation for permanent 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, and 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. Mitigation for permanent impacts to third and higher stream order⁹ (Figure 6-1) streams and second order streams with riparian vegetation shall be provided as follows:</p> <ol style="list-style-type: none"> 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:

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 Mitigation Measure RSM 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 Mitigation Measure RSM 12.</p> <p>³ Because of 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 mitigation planting 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 woody riparian habitats (e.g., existing or created channel lacking native woody riparian vegetation):</p> <table><tr><th>Mitigation Process</th><th>Area Ratios</th></tr><tr><td colspan="2">Priority Drainages</td></tr><tr><td>Enhance</td><td>4:1</td></tr><tr><td>Create/Restore</td><td>2:1</td></tr><tr><td colspan="2">Non-Priority Drainages</td></tr><tr><td>Enhance</td><td>3:1</td></tr><tr><td>Create/Restore</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	Mitigation Process	Area Ratios	Priority Drainages		Enhance	4:1	Create/Restore	2:1	Non-Priority Drainages		Enhance	3:1	Create/Restore	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 permanent 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 be designed in a manner that will not create a barrier to animal movement along the riparian corridor (see Avoidance and Minimization Measure RSM 1). 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 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 2: Mitigation for the Loss or Fill of Ponds and Freshwater Marsh Habitat Not Associated with Streams	Mitigation for direct impacts to pond or freshwater marsh habitat not hydrologically connected to streams shall be provided at a 2:1 ratio. 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.
RSM 3: Mitigation for the Loss or Fill of Seasonal Wetlands in the Inner Coast Range	Mitigation for direct impacts to seasonal wetlands in the Inner Coast Range shall be provided at a 2:1 ratio.
RSM 4: Temporary Impacts to Riparian, Stream, and Freshwater Marsh Habitat	<p>Temporary or short-term impacts (i.e., typically where project activities result in the removal of vegetation, except woody riparian vegetation, lasting less 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 reseeded 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 operations and maintenance activities in compliance with general avoidance and minimization measures (Section 6.3.1). 3. Implement BMPs consistent with Avoidance and Minimization Measure RSM 3 (Section 6.3.1) 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 ratios specified in Mitigation Measure RSM 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
	NOTE The above measure does not apply to maintenance and operation of constructed irrigation supply ditches associated with ongoing agricultural activities.
RSM 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 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 Mitigation Measure RSM 8.
RSM 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 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 9: Storm Water Discharge	<p>Municipal Plan Participants shall require all new development and redevelopment projects that will increase directly connected impervious area 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 methods¹⁰:</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 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 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





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	<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 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 VPG 2.2 through 2.14, 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 RSM 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 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, and Suisun Valley Creeks, and the Napa River) shall adhere to the guidelines developed by NOAA NMFS 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>
RSM 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 shall not create gaps in a riparian corridor greater than 100 ft. 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"> 1. 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 SCWA. All non-bank relocation sites shall meet the minimum reserve standards identified in Section 10.5 (e.g., site

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Mitigation Measure No. and Title	Mitigation Measure Description
	<p>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.</p> <p>2. Mitigation for Whole Shrub Removal: For each removed elderberry bush, plant a minimum of 5 elderberry seedlings or rooted cuttings and 5 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.</p> <p>3. Mitigation for Trimming/Removal of Stems 1 Inch in Diameter or Greater: For every 10 elderberry stems 1 inch in diameter or greater that are trimmed/removed, plant 2 elderberry seedlings and 2 associated native, woody riparian plant seedlings.</p> <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 1.</p>
RSM 13: Permanent Loss or Conversion of Tricolored Blackbird Foraging Habitat	<p>Mitigation for the permanent (more than one season) disturbance, destruction, or conversion of tricolored blackbird foraging habitat¹¹ 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. All foraging habitat affected either directly, indirectly, or cumulatively 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 5.10.1).</p> <ul style="list-style-type: none"> Exemptions: In-fill projects less than 5 ac in size and surrounded by 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 7.
RSM 14: Tricolored Blackbird Habitat Establishment	<p>Project proponents shall preserve and manage one active tricolored breeding colony for each active or known (active within last 5 years) breeding colony affected by Covered Activities. Preserved colonies should be of similar size to affected colonies.</p> <p>Mitigation Measure RSM 14 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</p>





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	suitable nesting habitat. Alternatively, project proponents may preserve known breeding colonies in Solano County subject to the requirements and approvals specified in Section 10.5.
GIANT GARTER SNAKE	
GGG 1: Operations and Maintenance Habitat Mitigation	SCWA, RD 2068, MPWD, and Dixon RCD 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 operations and maintenance activities for their facilities in the Giant Garter Snake Conservation Area (Figure 4-18).
GGG 2: Long-Term Impact Habitat Mitigation	Compensatory mitigation for unavoidable, long-term (longer than 2 years) and permanent 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: <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 Impacts¹²: Restore aquatic habitat at a ratio of 3:1 for avoided wetlands within 200 ft of proposed development, and restore upland habitat adjacent to restored aquatic habitat at a ratio of 2:1 restored upland acres to restored aquatic acres.
GGG 3: Invasive Species, Water Quality Control, Species Introductions, and Barrier Removal Enhancement Program	All development projects which 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 style="text-align: center;">NOTE Mitigation Measure GGS 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 1: Mitigation for Direct, Permanent Habitat Loss	Mitigation for unavoidable direct, permanent 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.
CM 2: Mitigation for Indirect Impacts to Marsh Habitat	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 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.
CM 3: Permanent Loss of 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.

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
CM 4: Mitigation for Direct, Temporary Habitat Loss	Mitigation for unavoidable direct, temporary (requires less than one growing season to re-establish 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.
CM 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 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 VPG 2.2 through 2.14, RSM 1.1, 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 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 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 Technical Advisory Committee (see Section 10.5.4).
CM 8: Delta Smelt and Sacramento Splittail Habitat Mitigation	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 operations 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 Mitigation Measure GGS 1.
SWAINSON'S HAWK	
SH 1: Irrigated Agriculture Foraging Habitat Conservation	Long-term impacts ¹³ 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) and subject to species management requirements specified in Objective SH 1.2 and Sections 7.3 and 10.5.3. Mitigation shall be provided in the Irrigated Agriculture Potential Reserve Area (Figure 4-27).
SH 2: Valley Floor Grassland Foraging Habitat Conservation	Long-term impacts to Swainson's hawk foraging habitat in the Valley Floor Grassland 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) and subject to species management requirements specified in Sections 7.3 and 10.5.3. Mitigation shall be provided in the Irrigated Agriculture or Valley Floor Grassland Potential Reserve Areas (Figure 4-27). Preservation of valley floor grassland habitat may be satisfied through Mitigation Measure VPG 2 if the minimum 1:1 ratio for foraging habitat is achieved.





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
SH 3: Inner Coast Range Foraging Habitat Conservation	<p>Long-term 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) and subject to species management requirements specified in Section 10.5.3. Mitigation shall be provided in the Irrigated Agriculture, Valley Floor Grassland, or Inner Coast Range Potential Reserve Areas (Figure 4-27). Preservation of Inner Coast Range habitat may be satisfied through implementation of Mitigation Measures RLF 2 and CSB 1 if the minimum 1:1 ratio for foraging habitat is achieved.</p> <ul style="list-style-type: none"> 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: projects affecting less than 1 year of forage production, activities related to establishment of natural habitats (e.g., aquatic, riparian, and grassland habitats), construction of in-fill developments that are less than 5 ac in size and surrounded by 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).
SH 4: Known Nest Trees	<p>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).</p> <p>For the purposes of Mitigation Measure SH 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 indirectly 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 a long-term indirect effect on the nest. <p>Applicants indirectly affecting nests shall:</p> <ol style="list-style-type: none"> a. Directly comply with Mitigation Measure SH 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 Resource Agencies (see Section 10.4.2), 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.

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	<p>NOTE</p> <p>Indirect effects described under Condition 2 above do not apply to Operations and Maintenance Covered Activities conducted in compliance with Avoidance and Minimization Measure SH 4: Active Nest Buffers. If such activities cannot be conducted in compliance with Avoidance and Minimization Measure SH 4, then the above requirements will apply.</p> <p>Mitigation Measure SH 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 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).
BURROWING OWL	
BO 1: Permanent Loss or Conversion of Foraging Habitat	<p>Mitigation for the permanent (more than one season) disturbance, destruction, or conversion of burrowing owl habitat¹⁴ 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 pre-construction surveys will be considered occupied by owls and require additional nesting habitat mitigation (see Mitigation Measure BO 2). All burrowing owl habitat affected either directly, indirectly, or cumulatively 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> <ul style="list-style-type: none"> Exemptions: In-fill projects less than 5 ac in size and surrounded by 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 1, BO 2, and BO 3, and Mitigation Measure BO 3.
BO 2: Known Nest Sites	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 (\$12,000 per nest at 2011 costs) to the SCWA Interim Nest Protection Program (see Section 10.2).





Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	Mitigation Measure BO 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.
BO 3: Preservation of Important Nesting Habitat	Covered Activities in Zone 1 will provide funding (to be implemented in conjunction with Mitigation Measure SH 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 4: Temporary Impacts	<p>If Covered Activities associated with construction of pump stations, antennae sites, new irrigation canals, buried pipelines, or utilities (but excluding restoration and reserve management activities) will result in temporary¹⁵ impacts to occupied burrowing owl habitat¹⁶ (e.g., closure, collapse due to ground disturbance, or disturbance in the construction zone), Covered Activities shall be mitigated according to the following criteria at all times of the year:</p> <ol style="list-style-type: none"> Temporary Impacts Less Than or Equal to 1 Acre in Size: Install 5 burrows within 330 ft of the edge of the construction area if suitable contiguous habitat remains and no more than one pair of owls without eggs or young in the nest is displaced. This condition may be waived if an Approved Biologist and the SCWA, in consultation with the HCP Technical Review Committee, determine that the contiguous area already contains suitable donor burrows. Maintain vegetation height at 6 inches or less around the mitigation burrows to encourage use by owls. <ol style="list-style-type: none"> A monitoring program will be implemented to track and document the use of nearby natural or artificial burrows by evicted owls¹⁷. Monitoring will be funded by the applicant conducting the project. Monitoring results will be reported to SCWA, CDFG, and USFWS at the end of the project. Artificial burrows will be maintained by the applicant who owns the project that results in burrow or habitat destruction. Artificial burrows shall be maintained for a minimum of 2 years following completion of the project that resulted in the temporary impact. The construction site will be monitored annually to ensure that natural burrows have been re-established on the construction site. <ol style="list-style-type: none"> If burrows have not been re-established on the construction site within 2 years but owls are using other ground squirrel burrows on or adjacent to the site, then the artificial burrows will not require maintenance beyond the 2-year period and no additional mitigation will be required. If the burrows have not been re-established in the construction area and owls are not using other natural burrows on or adjacent to the construction site within 2 years, then the impact will be considered permanent and mitigation will be required according to Mitigation Measure BO 1. The disturbed area shall also be monitored the following breeding season to determine if the owls return to the area to nest. If the owls do not return or relocate to a nearby site, the Covered Activities will be required to provide additional mitigation per Mitigation Measure BO2. If the above measures cannot be implemented because inadequate habitat is not present in surrounding, contiguous lands, Covered Activities shall be mitigated per the requirements of Mitigation Measure BO 2. Temporary Impacts Greater Than 1 Acre in Size: Install 10 burrows/acre within 330 ft of the construction area (see Avoidance and Minimization Measure BO 3) if at least 7 ac of contiguous habitat remains and no more than one pair of owls without eggs or young in the nest is displaced. Also maintain vegetation height at 6 inches or less around the mitigation burrows to encourage use by owls. This condition may be waived if an Approved Biologist

Table S.4: Mitigation Measures

Mitigation Measure No. and Title	Mitigation Measure Description
	<p>and the SCWA, in consultation with the HCP Technical Review Committee, determine that the contiguous area already contains suitable donor burrows. A monitoring program will be implemented to track and document the use of nearby natural or artificial burrows by evicted owls¹⁷. Monitoring will be funded by the applicant conducting the project. Monitoring results will be reported to SCWA, CDFG, and USFWS at the end of the project.</p> <ul style="list-style-type: none"> a. Artificial burrows will be maintained by the Plan Participant that owns the project that results in burrow or habitat destruction. Artificial burrows shall be maintained for a minimum of 2 years following completion of the project that resulted in the temporary impact. The construction site will be monitored annually to ensure that natural burrows have been re-established on the construction site. <ul style="list-style-type: none"> 1) If burrows have not been re-established on the construction site but owls are using other ground squirrel burrows on or adjacent to the site, then the artificial burrows will not require maintenance beyond the 2-year period and no additional mitigation will be required. 2) If the burrows have not been reestablished in the construction area and owls are not using other natural burrows on or adjacent to the construction site within 2 years, then the impact will be considered permanent and mitigation will be required according to Mitigation Measure BO 1. b. Temporary impacts that cannot be mitigated with mitigation burrows due to the lack of suitable burrowing owl habitat on a project site or contiguous ownership parcels shall be mitigated by preserving burrowing owl habitat off site at a ratio of 1:1. Sites subject to temporary impacts that are occupied by more than one pair of owls likewise will be mitigated at a 1:1 ratio. All habitat areas disturbed, destroyed, or converted to non-habitat uses directly, indirectly, or cumulatively will be subject to the mitigation requirement. The applicant will still have to implement Avoidance and Minimization Measure BO 3 to passively relocate owls. c. Compliance with Mitigation Measure BO 4 does not allow for the destruction or disturbance of an active nest site.
No mitigation measures are required for these species.	<p style="text-align: center;">Special Management Species</p> <p>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.</p>

Table footnotes are provided on the following page.





Table S.4: Mitigation Measures

Footnotes:

- ¹ Additional conditions of this mitigation requirement for impacts to occupied Contra Costa goldfield habitat are described in Mitigation Measure VPG 3.
- ² There are additional avoidance and mitigation requirements for impacts to habitat for Swainson's hawk and burrowing owl in Subarea 3 (see Sections 6.3.8 and 6.3.9, respectively).
- ³ If Contra Costa goldfields are not established successfully in this 10-year period and the increased restoration acreage requirement is invoked, the Contra Costa goldfield establishment requirement will be eliminated.
- ⁴ Any breeding habitat within 250 ft of development will be considered to be indirectly impacted.
- ⁵ 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 10 consecutive weeks.
- ⁶ 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; 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 Long-term impacts are defined as actions that result in the loss of habitat for more than one breeding or growing season.
- ⁸ Temporary effects are defined as actions that can be restored to baseline values or higher within one season following a disturbance.
- ⁹ Stream order is a classification based on the branching pattern of river systems. A first order stream is defined as the smallest unbranched tributary. As streams of equal order join, they result in a stream of the next higher order (i.e., when two first order streams join, they form a second order stream; when two second order streams join, they form a third order stream). See Figure 6-1.
- ¹⁰ 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.
- ¹¹ 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, and diked historic tidal wetlands within the Coastal Marsh Natural Community.
- ¹² Indirect impacts are based on the location/conservation value of the impacted habitat, not on the location of the project activity.
- ¹³ Long-term impacts are defined as those Covered Activities resulting in the loss of foraging habitat for more than 1 year.
- ¹⁴ 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 historic tidal wetlands within the Coastal Marsh Natural Community.
- ¹⁵ Not exceeding a single breeding season.
- ¹⁶ Sites that have been occupied at any time during the past 3 years will be considered occupied by owls and require mitigation.
- ¹⁷ Monitoring where owls go and what burrows they use may involve color banding of owls in order to track and distinguish evicted owls.

ac = acres

BMPs = Best Management Practices

CASQA = California Stormwater Quality Association

CDFG = California Department of Fish and Game

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

ppt = parts per thousand

RD 2068 = Reclamation District No. 2068

RWQCB = Regional Water Quality Control Board

SCWA = Solano County Water Agency

sf = square feet

SWRCB = State Water Resources Control Board

USFWS = United States Fish and Wildlife Service