

BDCP Conservation Measures for Additional Covered Species

San Joaquin kit fox

***Problem Statement:** Reduction, degradation, and fragmentation of San Joaquin kit fox habitat is hypothesized to have contributed to reduction in species abundance and distribution. Avoiding occupied dens and preserving grassland habitats in the limited area where this species has potential to occur within the Planning Area are expected to avoid or minimize impacts.*

Objective SJKF1.1: Maintain or increase the extent of San Joaquin kit fox habitat within the Planning Area.

Applicable Conservation Measures: HRCM16 and 17.

AMM_: **Conduct preconstruction surveys and avoid mortality of San Joaquin kit fox.** Conduct surveys for San Joaquin kit fox using the 1999 USFWS San Joaquin Kit Fox Survey Protocol for the Northern Range (see Appendix X). Occupied sites will be avoided according to the 1999 USFWS Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance (see Appendix X).

Riparian Woodrat

***Problem Statement:** There are no verified occurrences of riparian woodrat from the Planning Area. The nearest verified occurrences are along the Stanislaus River at Caswell Memorial State Park, approximately two miles east of the Planning Area. Reduction and fragmentation of its habitat are hypothesized to have contributed to reduction in species abundance and distribution. Remaining known occupied areas are also susceptible to flooding and fire that could substantially reduce or extirpate the populations. Avoiding impacts on individuals and occupied habitats and increasing the extent of woodrat habitat is expected to help maintain the existing populations, and increasing the extent of available habitat will provide opportunities for the establishment of additional occupied habitat areas, thus reducing the potential for extinction.*

Objective RIWO1.1: Increase the extent of riparian woodrat habitat near occupied habitats within the Planning Area.

Applicable Conservation Measures: HRCM11 through HRCM14.

Objective RIWO1.2: Avoid mortality of riparian woodrat and removal or degradation of occupied habitat associated with implementation of covered activities and conservation measures.

Applicable Avoidance and Minimization Measures: AMM3

AMM_: **Conduct preconstruction surveys and avoid mortality of riparian woodrat.** Assess habitat suitability for riparian woodrat and if habitat is considered potentially occupied conduct protocol surveys according to the USFWS Draft Habitat Assessment Guidelines and Survey Protocol for the Riparian Brush Rabbit and the Riparian Woodrat (see Appendix X). If occupied riparian woodrat is present along construction corridors, avoid mortality by 1) reducing the corridor width to avoid occupied riparian habitat, 2) if feasible, consider tunneling beneath the occupied riparian corridor, and 3) if appropriate, coordinate with the USFWS to develop a trapping and relocation program. All trapped animals will be relocated to approved sites prior to construction activities. If occupied riparian brush rabbit is present within proposed habitat restoration sites, avoid mortality and minimize impacts on individuals by 1) selecting alternative unoccupied restoration sites; or 2) designing the habitat restoration to avoid direct impacts on individuals, minimize impacts on riparian woodrat habitat, and include brush rabbit habitat in the restoration project design.

Townsend's western big-eared bat

***Problem Statement:** There are no verified roosting occurrences of Townsend's western big-eared bat from the Planning Area. The nearest verified occurrences are in northwest Yolo County, two sites in Alameda County, and one site in the hills south of Livermore in Contra Costa County. Potential roosting habitats in the Planning Area are restricted to old barns and other buildings and possibly bridges. Disturbance and destruction of roost sites is hypothesized to have contributed to reduction in species abundance and distribution. Loss of riparian forests may also contribute by reducing foraging habitats. Avoiding removal of occupied roost sites in the Planning Area is expected to minimize direct impacts to this species, and increasing the extent of riparian habitats is expected to increase foraging opportunities.*

Objective TWBB1.1: Increase the extent of Townsend's western big-eared bat foraging habitat within the Planning Area.

Applicable Conservation Measures: HRCM10 through HRCM14.

AMM_: **Conduct pre-construction surveys and avoid and minimize impacts on Townsend's western big-eared bat.** Identify suitable Townsend's western big-eared bat roosting habitat within the project footprint and conduct preconstruction visual and auditory surveys using bat detection equipment (e.g., Anabat) at potentially occupied sites. Postpone project activities that would disturb active roost sites while sites are occupied.

Suisun song sparrow

Problem Statement: *Reduction, degradation, and fragmentation of tidal marsh habitats in Suisun Marsh are hypothesized to have contributed to reduction in species abundance and distribution. Increasing the extent of intertidal marsh, channel margin, and subtidal aquatic habitat in the Suisun Marsh and West Delta Restoration Opportunity Areas that support Suisun song sparrow habitat is expected to help maintain and increase the species distribution and abundance.*

Objective SSSP1.1: Increase the extent of Suisun song sparrow nesting habitat within the Suisun Marsh.

Applicable Conservation Measure: HRCM6 and 9.

AMM_: **Conduct pre-construction surveys and avoid and minimize impacts on Suisun song sparrow.** Conduct pre-construction surveys of potentially-occupied breeding habitat within 0.25 miles from the project footprint limit of habitat restoration projects in the Suisun Marsh Restoration Opportunity Area and potentially occupied habitats in the West Delta Restoration Opportunity Area. Pre-construction surveys will be conducted during the breeding season prior to project activity. If an active Suisun song sparrow nest is present, avoid mortality and minimize impacts by creating a []-foot no-disturbance buffer around the nest site and allow no entry of any kind into the buffer while the site is occupied during the breeding season (approximately early April through late-August). Entry into the buffer is granted when a qualified biologist, with concurrence from USFWS and DFG, determines that healthy young have fledged and nest sites are no longer active.

White-tailed kite

Problem Statement: *Loss, degradation, and fragmentation of white-tailed kite nesting and foraging habitats and reduction in prey availability are hypothesized to have contributed to reduction in species abundance and distribution. Increasing the extent of riparian forest that supports white-tailed kite nesting habitat and maintaining sufficient foraging habitat to support white-tailed kite in the Planning Area is expected to help maintain and increase the species distribution and abundance.*

Objective WTKI1.1: Increase the extent of white-tailed kite nesting habitat within the Planning Area that is located within [] miles of white-tailed kite foraging habitat.

Applicable Conservation Measures: HRCM16 through HRCM24.

Objective WTKI1.2: Maintain or increase the extent of protected white-tailed kite foraging habitat within the Planning Area.

Applicable Conservation Measures: HRCM15 through 18

AMM_: **Conduct preconstruction surveys and avoid mortality of nesting white-tailed kites.** Conduct pre-construction surveys of potentially-occupied breeding habitat within 0.25 miles from the project footprint limits and within 0.25 miles of planned restoration sites to locate active white-tailed kite nest sites. Pre-construction surveys are conducted during the breeding season (March 1 to September 1), prior to project activity, and during the planned construction year. Create a foot no-disturbance buffer around each active nest and allow no entry of any kind into the buffer while the site is occupied during the breeding season. The buffer can be reduced through consultation with a qualified biologist and with concurrence from USFWS and DFG based on line-of-sight, topography, land uses, type of disturbance, ambient noise and disturbance levels, and other issues. Entry into the buffer is granted when a qualified biologist, with concurrence from USFWS and DFG, determines that young have fledged, capable of independent survival, and nest sites are no longer active. If nest tree removal is necessary, tree removal will occur only during the non-breeding season (September through February).

Western Pond Turtle

***Problem Statement:** Loss, degradation, and fragmentation of aquatic and adjacent upland habitats that historically supported western pond turtle (breeding, cover, and aestivation habitat) is hypothesized to be the primary cause for reductions in the abundance and distribution of this species. Increasing the extent of riparian, intertidal marsh, channel margin, grassland, non-tidal perennial aquatic, and non-tidal perennial permanent emergent marsh is expected to help maintain and provide the basis for potentially increasing the distribution and abundance of western pond turtle in the Planning Area and Suisun Marsh.*

Objective WEPT1.1: Increase the extent of western pond turtle aquatic habitat within the Planning Area and Suisun Marsh.

Applicable Conservation Measures: HRCM4 through 10 and HRCM22 through 24.

Objective WEPT1.2: Maintain or increase the extent of western pond turtle upland habitat near suitable aquatic habitats within the Planning Area.

Applicable Conservation Measures: HRCM10 through 14 and HRCM16 and 17.

AMM_: **Conduct preconstruction surveys and avoid and minimize impacts to western pond turtle.** Assess habitat suitability for western pond turtle in areas that could be affected by construction of project facilities, and if habitat is considered suitable conduct visual surveys to determine occupancy. If occupied sites are isolated pools or

ponds, avoid disturbance to occupied sites within or near the project footprint to the extent feasible and minimize the loss of occupied and potentially occupied aquatic habitat and grassland vegetation through adjustments in project design, as practicable. If occupied sites are along streams or channels, install temporary aquatic barriers and relocate and exclude animals from the work area. Coordinate with the USFWS and DFG to develop a trapping and relocation program and to develop appropriate seasonal restrictions to minimize mortality. Capture and relocate individuals found within the construction footprint to receiving habitat approved by USFWS and DFG.

California red-legged frog

***Problem Statement:** Reduction and fragmentation of California red-legged frog habitat and the introduction of non-native species are hypothesized to have contributed to reduction in species abundance and distribution. Avoidance or replacement of habitat values in the limited area where this species has potential to occur within the Planning Area is expected to avoid or minimize impacts. Preserving or increasing the extent of non-tidal perennial aquatic and non-tidal perennial permanent emergent marsh habitat is expected to maintain and potentially could increase the species distribution and abundance.*

Objective CRLF1.1: Maintain or increase the extent of protected California red-legged frog breeding and upland habitats within the Planning Area.

Applicable Conservation Measures: HRCM16, 17, 22-24.

AMM_: **Conduct preconstruction surveys and avoid impacts to California red-legged frog.** Assess habitat suitability for California red-legged frog in areas that could be affected by construction of project facilities, and if habitat is considered suitable conduct protocol surveys according to the 2005 USFWS Guidance on Site Assessments and Field Surveys for the California Red-legged Frog (see Appendix X). Avoid disturbance to occupied sites within or near the project footprint to the extent feasible and minimize the loss of occupied and potentially occupied aquatic habitat and grassland vegetation through adjustments in project design, as practicable. As needed, coordinate with the USFWS and DFG to develop a trapping and relocation program and to develop appropriate seasonal restrictions to minimize mortality. Capture and relocate individuals found within the construction footprint to receiving habitat approved by USFWS and DFG.

California tiger salamander

***Problem Statement:** Loss, degradation, and fragmentation of wetland and upland habitats that historically supported California tiger salamander (foraging, breeding, and hibernation habitat) is hypothesized to be the primary cause for reductions in the*

abundance and distribution of this species. Preserving and restoring seasonal wetlands and grasslands is expected to help maintain and provide the basis for potentially increasing the distribution and abundance of California tiger salamander in the Planning Area.

Objective CATS1.1: Maintain or increase the extent of protected California tiger salamander breeding and upland habitats within the Planning Area.

Applicable Conservation Measures: HRCM16 through 24

AMM_: **Conduct pre-construction surveys and avoid and minimize impacts on California tiger salamander.** Identify suitable aquatic habitat (vernal pools and ponds) for California tiger salamander within 0.25 miles of the project footprint limits. Conduct pre-construction surveys of suitable aquatic habitat using approved survey protocols. Avoid disturbance to occupied sites within or near the project footprint to the extent feasible and minimize the loss of occupied and potentially occupied seasonal pool and grassland vegetation through adjustments in project design, as practicable. As needed, coordinate with the USFWS and DFG to develop a trapping and relocation program and to develop appropriate seasonal restrictions to minimize mortality. Capture and relocate individuals found within the construction ROW to receiving habitat approved by USFWS and DFG.

Heartscale

Problem Statement: *Loss and degradation of alkaline/saline seasonal wetland, alkaline sink scrub, and grassland habitats and their watersheds that historically supported heartscale is hypothesized to be the primary cause for reductions in the abundance and distribution of heartscale. Preservation and restoration of alkaline/saline seasonal wetland, and alkaline sink scrub habitats and their watersheds is expected to help maintain and provide the basis for potentially increasing the distribution and abundance of heartscale in the Planning Area.*

The following natural community objectives also contribute towards achieving this goal: NACO1.5-1.6.

Objective HEAR1.1: Maintain or increase the extent of protected alkaline/saline seasonal wetland, alkaline sink scrub, and grassland habitats that support heartscale habitat within the Planning Area and Suisun Marsh.

Applicable Conservation Measures: HRCM18 through HRCM20.

HEAR CM1: Compensate for loss or degradation of Heartscale occurrences. Replace the extent of occupied heartscale habitat removed or degraded by covered

activities and conservation measures by restoring comparable habitat at a ratio of █:1 or preserve █ currently unprotected occurrences of this species for each occurrence removed or degraded by BDCP actions. To the extent determined to be practicable prior to the impact, salvage and transplant seed propagules from the affected site to restored habitats.

Brittlescale

Problem Statement: *Loss and degradation of vernal pool, alkaline/saline seasonal wetland, alkaline sink scrub, and grassland habitats and their watersheds that historically supported brittlescale is hypothesized to be the primary cause for reductions in the abundance and distribution of brittlescale. Preservation and restoration of alkaline/saline seasonal wetland, and alkaline sink scrub habitats and their watersheds is expected to help maintain and provide the basis for potentially increasing the distribution and abundance of brittlescale in the Planning Area.*

The following natural community objectives also contribute towards achieving this goal: NACO1.5-1.6.

Objective BRIT1.1: Maintain or increase the extent of protected vernal pool, alkaline/saline seasonal wetland, alkaline sink scrub, and grassland habitats that support brittlescale habitat within the Planning Area and Suisun Marsh.

Applicable Conservation Measures: HRCM18 through HRCM20.

BRIT CM1: Compensate for loss or degradation of Brittlescale occurrences. Replace the extent of occupied brittlescale habitat removed or degraded by covered activities and conservation measures by restoring comparable habitat at a ratio of █:1 or preserve █ currently unprotected occurrences of this species for each occurrence removed or degraded by BDCP actions. To the extent determined to be practicable prior to the impact, salvage and transplant seed propagules from the affected site to restored habitats.

Lesser Saltscale

Problem Statement: *Loss and degradation of vernal pool, alkaline/saline seasonal wetland, alkaline sink scrub, and grassland habitats and their watersheds that historically supported lesser saltscale is hypothesized to be the primary cause for reductions in the abundance and distribution of lesser saltscale. Preservation and restoration of alkaline/saline seasonal wetland, and alkaline sink scrub habitats and their watersheds is expected to help maintain and provide the basis for potentially increasing the distribution and abundance of lesser saltscale in the Planning Area.*

The following natural community objectives also contribute towards achieving this goal: NACO1.5-1.6.

Objective LESA.1: Maintain or increase the extent of protected vernal pool, alkaline/saline seasonal wetland, and alkaline sink scrub, and grassland habitats that support lesser saltscale habitat within the Planning Area and Suisun Marsh.

Applicable Conservation Measures: HRCM18 through HRCM20.

LESA CM1: Compensate for loss or degradation of Lesser Saltscale occurrences. Replace the extent of occupied lesser saltscale habitat removed or degraded by covered activities and conservation measures by restoring comparable habitat at a ratio of █:1 or preserve █ currently unprotected occurrences of this species for each occurrence removed or degraded by BDCP actions. To the extent determined to be practicable prior to the impact, salvage and transplant seed propagules from the affected site to restored habitats.

Slough Thistle

Problem Statement: *Loss of natural flooding regimes on the San Joaquin River and intensive agriculture are hypothesized to be cause for reductions in the abundance and distribution of Slough thistle. Preservation and restoration of flood plain habitat is expected to help maintain and provide the basis for potentially increasing the distribution and abundance Slough thistle in the project area.*

The following ecosystem and natural community objectives also contribute towards achieving this goal: ECSY5.1 and NACO1.2.

Objective SLTH1.1 Increase the extent of slough thistle habitat within the Planning Area.

Applicable Conservation Measures: HRCM1.

SLTH CM1: Compensate for loss or degradation of Slough Thistle occurrences. Replace the extent of occupied slough thistle habitat removed or degraded by covered activities and conservation measures by restoring comparable habitat at a ratio of █:1 or preserve █ currently unprotected occurrences of this species for each occurrence removed or degraded by BDCP actions. To the extent determined to be practicable prior to the impact, salvage and transplant seed propagules from the affected site to restored habitats.

Suisun Thistle

Problem Statement: *Loss and degradation of some component of brackish tidal marsh habitat is hypothesized to be cause for reductions in the abundance and distribution of Suisun thistle. Preservation and restoration of tidal brackish marsh is expected to help maintain and provide the basis for potentially increasing the distribution and abundance Suisun thistle in the Suisun Marsh.*

The following ecosystem and natural community objectives also contribute towards achieving this goal: ECSY15.1 and NACO1.2 and 1.6.

Objective SUTH1.1: Increase the extent of brackish tidal habitats that support Suisun thistle in Suisun Marsh.

Applicable Conservation Measures: HRCM9.

Objective SUTH1.2: Restore tidal marsh in portions of the Planning Area that may support Suisun thistle habitat in future years with sea level rise.

Applicable Conservation Measures: HRCM6.

Boggs Lake Hedge-Hyssop

Problem Statement: *Loss and degradation of vernal pool and natural seasonal wetland habitats and their watersheds that historically supported Boggs Lake hedge-hyssop is hypothesized to be the primary cause for reductions in the abundance and distribution of Boggs Lake hedge-hyssop. Preservation and restoration of vernal pool, vernal pool complex, alkaline/saline seasonal wetland, and alkaline sink scrub habitats and their watersheds is expected to help maintain and provide the basis for potentially increasing the distribution and abundance Boggs Lake hedge-hyssop in the Planning Area.*

The following natural community objectives also contribute towards achieving this goal: NACO1.6-1.7.

Objective BLHH1.1: Maintain or increase the extent of protected vernal pool and natural season wetland habitats that support Boggs Lake hedge-hyssop habitat within the Planning Area.

Applicable Conservation Measures: HRCM18 through HRCM20.

BLHH CM1: Compensate for loss or degradation of Boggs Lake hedge-hyssop occurrences. Replace the extent of occupied Boggs Lake hedge-hyssop habitat removed or degraded by covered activities and conservation measures by restoring comparable habitat at a ratio of ■:1 or preserve ■ currently unprotected occurrences of this species for each occurrence removed or degraded

by BDCP actions. To the extent determined to be practicable prior to the impact, salvage and transplant seed propagules from the affected site to restored habitats.

Carquinez Goldenbush

Problem Statement: *It is not known why the abundance and distribution of Carquinez goldenbush is so limited*

The following ecosystem and natural community objectives also contribute towards achieving this goal: NACO1.2.

. **Objective CAGO1.1:** Maintain or increase the extent of protected grassland and seasonal wetlands on alkaline and saline soil habitats that support Carquinez goldenbush habitat within the Planning Area and Suisun Marsh.

Applicable Conservation Measures: HRCM18 through HRCM20.

CAGO CM1: Compensate for loss or degradation of Carquinez goldenbush occurrences. Replace the extent of occupied Carquinez goldenbush habitat removed or degraded by covered activities and conservation measures by restoring comparable habitat at a ratio of ___:1 or preserve ___ currently unprotected occurrences of this species for each occurrence removed or degraded by BDCP actions. To the extent determined to be practicable prior to the impact, salvage and transplant vegetative and seed propagules from the affected site to restored habitats.

Caper-Fruited Tropicarpum

Goal CAFT1: Maintain occurrences of caper-fruited tropidocarpum that become established on lands managed by BDCP.

Problem Statement: *It is not known why the abundance and distribution of caper-fruited tropidocarpum is so limited.*

Objective CAFT1.1: Protect occurrences of caper-fruited tropidocarpum if they establish from potentially existing seed banks in areas disturbed by BDCP actions.¹

¹ Caper-fruited tropidocarpum historically occurred in the vicinity of Clifton Court Forebay, but is now considered to be extirpated from the Planning Area. This species has a long-lived seed bank that could be present in the area of the Forebay. BDCP action-related ground disturbances in this area could activate seed germination and result in reestablishment of one or more occurrences.

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