

### Summary of SAIC Proposed Covered Species Habitat Mitigation and Conservation

**Note:** This table presents draft proposed SAIC recommendations for covered species habitat conservation targets. Targets identify Conservation Zones within the Planning Area and Suisun Marsh within which habitat conservation should occur to achieve species objectives. Habitat targets, however, may be partially or wholly implemented outside of the Planning Area consistent and in coordination with other conservation plans in locations where the intended species objectives may be achieved. Proposed mitigation and conservation targets include summary rationale statements describing SAIC's bases for the proposed targets. A complete description of mitigation and conservation strategies for each of the species will be provided in the next version of Draft Chapter 3.

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
San Joaquin kit fox								<p><b>Mitigation:</b> Mitigation for impacts on San Joaquin kit fox habitat will be achieved by applying the USFWS standard guideline 3:1 habitat replacement ratio. For each acre of suitable grassland breeding habitat affected, 3 acres of grassland breeding habitat will be protected. Conservation will occur entirely within Conservation Zone 8, which supports 75 percent of kit fox breeding habitat in the Planning Area. Breeding habitat in other Conservation Zones occurs in small fragmented patches that likely support minimal habitat function for the species. Habitat will be located such that movement corridors linking to adjoining kit fox habitats within and adjacent to the Planning Area are maintained. Declines in prey abundance associated with ground squirrel poisoning programs have also been linked to reduced kit fox abundance. Consequently, preserved grassland will be managed to increase the abundance of San Joaquin kit fox mammalian prey species (e.g., ground squirrels).</p> <p>Affected foraging and dispersal habitat is comprised of cultivated lands on the valley floor that are adjacent to and generally east of uncultivated grasslands. While kit fox are occasionally known to travel through cultivated habitats, there is no indication that this area is either occupied or is accessible for kit fox use. The cultivated lands are also not transitional to other potentially occupied habitats on the valley floor. Therefore, the removal of cultivated lands in the vicinity of uncultivated grasslands (as defined in the BDCP San Joaquin kit fox habitat model) is unlikely to affect the species and thus no mitigation for this impact is proposed.</p> <p><b>Conservation Provided:</b> Conservation of kit fox will be provided through preservation of its grassland breeding, foraging, and dispersal habitat. A primary stressor on the kit fox is loss and fragmentation of its grassland habitat through urban and agricultural expansion and preservation of this habitat type is considered to be the most effective approach to its conservation. Preservation of breeding habitat is focused on preserving the largest remaining contiguous patches of breeding habitat; remaining unprotected kit fox breeding habitat areas, which are located in Conservation Zone 8. Conserved habitat will be managed as described for mitigation habitat and will be located such that it is linked to mitigation habitat and the approximate 620 acres of existing preserved habitat in Conservation Zone 8. Following preservation of mitigation and conservation habitat, approximately 42 percent of modeled kit fox grassland habitat in Conservation Zone 8 will be preserved. The proposed habitat conservation actions are expected to maintain sufficient habitat area to sustain the existing population and to maintain connectivity with occupied core populations adjacent to the Planning Area.</p>
<i>Breeding, foraging, and dispersal habitat</i>	190	0	190	560 CZ: 8	0	440 CZ: 8	0	
<i>Foraging and dispersal habitat</i>	670	0	670	0	0	0	0	
Riparian woodrat	0	0	0	0	0	0	100	<b>Mitigation:</b> BDCP actions are not expected to affect riparian woodrat habitat or individuals, therefore, no

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							CZ: 7	<p>mitigation is required.</p> <p><b>Conservation Provided:</b> Conservation of riparian woodrat will be provided through restoration of riparian habitat that supports woodrat habitat elements within its historical range along Old River, Middle River, and/or the San Joaquin River in Conservation Zone 7. In addition to the species limited distribution and abundance, flooding and predation are primary stressors on this species. The restored riparian woodrat habitat will be designed to incorporate flood refugia habitat and will be managed to control predation. A total of 1,076 acres of modeled riparian woodrat habitat is present in the Planning Area of which approximately 6 percent is currently protected. Restoration of 100 acres of habitat will increase the extent of existing habitat by 9 percent. A portion of the remaining 4,900 acres of BDCP restored riparian habitat is expected to also support riparian brush habitat over the term of the BDCP. The riparian woodrat is not currently known to inhabit the Planning Area. Consequently, the restored habitat will serve to accommodate the future expansion of populations located upstream of the Planning Area or provide habitat for future reintroductions of the species. Because BDCP actions are not expected to affect this species and the proposed riparian restoration will specifically restore elements of this species habitat within its historical range, the proposed conservation measures are expected to provide for the conservation of riparian woodrat.</p>
Salt marsh harvest mouse								<p><b>Mitigation:</b> Impacts on salt marsh harvest mouse habitat result from restoration of tidal habitat that removes its modeled non-tidal managed wetland and tidal marsh habitat. Mouse habitat will be restored in the same locations as affected habitat and will reestablish its historical tidal Suisun Marsh habitat conditions. Consequently, these impacts are considered to be temporary. Restored tidal marsh plain mitigation habitat will be designed to include upland habitat area that supports high functioning mouse flood refugia habitat. The extent of preserved flood refugia habitat needed to be preserved will depend on the configuration of the restored marsh.</p> <p>This is no standard mitigation ratio to address habitat impacts on salt marsh harvest mouse. Habitat replacement ratios typically range between 1:1 and 3:1, and are generally designed to address permanent losses of habitat. Because impacts associated with BDCP are temporary and are designed to restore natural marsh conditions and function and thus improve habitat for salt marsh harvest mouse, a mitigation ratio of 1:1 was selected.</p> <p>Habitat will be restored in a manner that minimizes temporary effects of habitat loss on the species. Habitat will be restored in larger patches than the existing patches of habitat that are fragmented by dikes, roads, unsuitable habitat areas, and other infrastructure. Non-native predators (e.g., feral cats) are believed to be an important stressor on this species. Management of mitigation habitats will include control of non-native predators to help maintain the species abundance. Mitigation habitat will also be monitored to assess the status of the species and will be adaptively managed to ensure high habitat function for the mouse is maintained.</p> <p><b>Conservation Provided:</b> Conservation of salt marsh harvest mouse will be provided through restoration and management of brackish tidal marsh plain and associated preserved upland refugia habitats as described for mitigation habitat. Restoration of tidal marsh in Suisun Marsh is consistent with and helps achieve the salt marsh harvest mouse objectives of the draft tidal marsh ecosystems recovery plan (USFWS 2010). The proposed restoration and management of tidal marsh plain and flood refugia habitats are expected to sustain the existing population and provide for future expansion of its abundance and distribution.</p>
Wetland habitat	2,260	0	2,260	0	2,260 CZ: 11	0	1,420-2,570 CZ: 11	

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<i>Upland habitat</i>	670	0	670	350-700 CZ: 11	0	0	350-700 CZ: 11	
Riparian brush rabbit	0	0	0	0	0	0	100 CZ: 7	<p><b>Mitigation:</b> BDCP actions are not expected to affect riparian woodrat habitat or individuals, therefore, no mitigation is required.</p> <p><b>Conservation Provided:</b> Conservation of riparian brush rabbit will be provided through restoration of riparian habitat that supports brush rabbit habitat elements within its historical range along Old River, Middle River, and/or the San Joaquin River in Conservation Zone 7. Restored habitat will be located such that linkages to currently occupied habitat are provided. In addition to the species limited distribution and abundance, flooding and predation are primary stressors on this species. The restored riparian brush rabbit habitat will be designed to incorporate flood refugia habitat and will be managed to control predation. A total of 1,681 acres of modeled riparian brush rabbit habitat is present in the Planning Area of which approximately 7 percent is currently protected. Restoration of 100 acres of habitat will increase the extent of existing habitat by 6 percent. A portion of the remaining 4,900 acres of BDCP restored riparian habitat is expected to also support riparian brush habitat over the term of the BDCP. In addition, the restored habitat will serve to accommodate the future expansion of the existing population or provide habitat for future introductions of the species. The proposed restoration and management of riparian brush rabbit habitat are expected to sustain the existing population and provide for future expansion of its abundance and distribution within the Planning Area.</p>
Townsend's western big-eared bat								<p><b>Mitigation:</b> Presence of Townsend's big-eared bat has not been documented in the Planning Area or Suisun Marsh, but is known to occur in Central Valley locations near the Planning Area. Affected roosting and primary foraging habitat is comprised of woody riparian vegetation. Habitat mitigation guidelines have not been established for this species. Mitigation for roosting and primary foraging habitat will be provided through restoration of 1 acre of habitat for each acre of affected habitat. Mitigation habitat will be monitored to assess occupancy by the species and managed to minimize human disturbances that could affect roosting bats.</p> <p>All Planning Area land cover types, including BDCP restored habitats, support Townsend's western big-eared bat foraging habitat and no net loss of foraging habitat is expected. Secondary foraging habitat is abundant and not likely limiting the species abundance and distribution. Consequently, temporary removal of secondary foraging habitat is unlikely to affect the species and, therefore, no mitigation is required. BDCP habitat mitigation and conservation measures, however, will result in the preservation of <del>XXX</del> acres of secondary foraging habitat. The function of these preserved habitats as foraging habitat is expected to be greater than the function of affected habitats because production of flying insect prey is expected to be greater in restored marsh, non-tidal wetland, and riparian habitats than on the largely affected agricultural foraging habitats.</p> <p><b>Conservation Provided:</b> Conservation of Townsend's western big-eared bat will be provided through restoration and management of restored riparian roosting and primary foraging habitat as described for mitigation habitat. Conservation is focused on restoration of roosting and primary foraging habitat because these habitats have been substantially restored from historical conditions within the Central Valley. Based on the level of BDCP habitat effect and the extent of proposed habitat restoration and management requirements, the proposed conservation measures are expected to provide for the conservation of Townsend's western big-eared bat.</p>
<i>Roosting and primary foraging habitat</i>	780	0	780	0	960 CZ: Any CZ		4,040 CZ: Any CZ	

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<i>Primary foraging habitat</i>	170	1	170	0				
<i>Secondary foraging habitat</i>	0	69,839	69,839	0	0	0	0	
Suisun shrew	440	0	440	0	440	0	3,230-4,380	<p><b>Mitigation:</b> Impacts on Suisun shrew habitat result from restoration of tidal habitat that removes its modeled tidal marsh habitat. Shrew habitat will be restored in the same locations as affected habitat and will reestablish its historical tidal Suisun Marsh habitat conditions. Consequently, these impacts are considered to be temporary. Restored tidal marsh plain mitigation habitat will be designed to include upland habitat area that supports high functioning shrew flood refugia habitat.</p> <p>Habitat will be restored in a manner that minimizes temporary effects of habitat loss on the species. Habitat will be restored in larger patches than the existing patches of habitat that are fragmented by dikes, roads, unsuitable habitat areas, and other infrastructure. Non-native predators (e.g., feral cats) are believed to be an important stressor on this species. Management of mitigation habitats will include control of non-native predators to help maintain the species abundance. Mitigation habitat will also be monitored to assess the status of the species and will be adaptively managed to ensure high habitat function for the shrew.</p> <p><b>Conservation Provided:</b> Conservation of Suisun shrew will be provided through restoration and management of brackish tidal marsh plain and associated preserved upland refugia habitats as described for mitigation habitat. Restoration of tidal marsh in Suisun Marsh is consistent with and helps achieve the Suisun shrew objectives of the draft tidal marsh ecosystems recovery plan (USFWS 2010). The proposed restoration and management of tidal marsh plain and flood refugia habitats are expected to sustain the existing population and provide for future expansion of its abundance and distribution.</p>
Tricolored blackbird								<p><b>Mitigation:</b> All but 11 acres of tricolored blackbird modeled emergent marsh breeding habitat will be affected by restoration of tidal habitats. This analysis assumes that restoration of tidal habitat will remove all currently suitable habitat, although the actual extent of habitat that will be removed is undetermined and it is likely that some portion of the existing suitable tricolored blackbird breeding habitat will be retained. Nesting habitat mitigation will be provided through restoration of tidal marsh plain that will support patches of emergent vegetation suitable for nesting. Because tidal nesting habitat will be restored in large contiguous patches, restored nesting habitat is expected to provide higher nesting habitat functions than existing affected habitats, which are generally fragmented and subject to disturbance during the breeding season. Implementation of BDCP actions will also avoid removal of active nesting colonies.</p> <p>Because the primary factors limiting tricolored blackbird abundance and distribution is the availability of high functioning nesting habitat free from disturbance, impacts on foraging habitat will be mitigated through preservation of 0.5 acre of foraging habitat or each affected acre. Impacts on non-agricultural foraging habitat will be mitigated through preservation of grassland, alkali seasonal wetland, and vernal pool complex habitat, and impacts on agricultural foraging habitats will be mitigated through preservation of cultivated lands or natural foraging habitats. Preserved habitat will be located within at least 8 miles of suitable nesting habitats to provide forage in support of nesting birds.</p> <p><b>Conservation Provided:</b> Conservation of tricolored blackbird will be provided through restoration and management of tidal marsh plain and non-tidal marsh that support extensive patches of emergent vegetation suitable for nesting as described for mitigation of nesting habitat. The proposed preservation restoration and management of</p>

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								tidal marsh plain are expected to sustain the existing population and provide for future expansion of its abundance and distribution.
<i>Nesting habitat</i>	4,120	0	4,120	0	4,120 CZ 1, 2, 4, 7, 11	0	13,250-22,750 CZ 1, 2, 4, 7, 11	
<i>Foraging habitat: non-agriculture</i>	5,540	2	5,540	2770 CZ1,2, or 4				
<i>Foraging habitat: agriculture</i>	17,040	1,630	18,670	9,340 CZ 1-9				
Suisun song sparrow	4,680	0	4,680	0	2,340 CZ 11	0	1,340-2,490 CZ:11	<p><b>Mitigation:</b> Impacts on Suisun song sparrow habitat result from restoration of tidal habitats in the Suisun Marsh that removes its modeled habitat. Impact calculations were based on vegetation type and association; however, Suisun song sparrows most frequently are found along relatively narrow corridors associated with stream channels which are not included in the species' habitat model; consequently, impacts based on modeled habitat likely substantially over estimate impacts relative to impacts on its actual habitat, which occurs in patches within the modeled habitat. Song sparrow habitat will be restored in the same general locations as affected habitat and will reestablish its historical tidal Suisun Marsh habitat conditions. Habitat will be restored in a manner that minimizes temporary effects of habitat loss on the species. Habitat will be restored in larger patches than the existing patches of habitat that are fragmented by dikes, roads, unsuitable habitat areas, and other infrastructure. Non-native predators (e.g., feral cats) are believed to be an important stressor on this species. Mitigation habitat will be designed to include channel habitat edges that support high functioning Suisun song sparrow nesting habitat, including establishing tidal marsh habitats dominated by <i>Salicornia</i>, <i>Spartina</i>, and <i>Grindelia</i>. It is expected that restoration actions will substantially improve habitat conditions for Suisun song sparrow and enhance breeding populations. In addition, predator control activities, reduction in pesticide use, and a reduction in habitat fragmentation associated with restoration activities will further improve habitat conditions. Monitoring will provide data on baseline populations, local effects of restoration activities, and post-restoration distribution and abundance of Suisun song sparrow.</p> <p>There are no standard habitat mitigation guidelines for impacts on Suisun song sparrow habitat. Each acre of affected habitat will be replaced with 0.5 acre of restored habitat that is expected to support substantially higher habitat function for the song sparrow than the affected habitat, much of which is not managed as song sparrow habitat. This mitigation habitat replacement ratio is considered appropriate because the restoration of habitat elements necessary to support Suisun song sparrow are expected to keep pace with removal of existing habitat, a substantial amount of the total impact acreage is unlikely to be occupied or suitable for Suisun song sparrow, and overall habitat conditions are expected to improve from the current conditions.</p> <p><b>Conservation Provided:</b> Opportunities for the conservation of Suisun song sparrow are limited to Suisun Marsh (i.e., Conservation Zone 11) because the species is endemic to marshes surrounding Suisun Bay. Conservation will be provided through restoration of an estimated 1,338-2,488 acres of tidal brackish marsh plain designed and managed to support patches of species habitat as described for restored mitigation habitat. Restored mitigation and conservation habitats will be contiguous and managed to provide greater habitat functions that supported by existing</p>

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								habitat areas. Restoration of tidal marsh in Suisun Marsh is consistent with and helps achieve the Suisun song sparrow objectives of the draft tidal marsh ecosystems recovery plan (USFWS 2010). The proposed restoration and ongoing management of tidal marsh habitat for this species is expected to provide for a sustainable and expanding population of Suisun song sparrow.
Yellow-breasted chat								<p><b>Mitigation:</b> Impacts on yellow-breasted chat result from BDCP actions that remove modeled yellow-breasted chat riparian habitats. Primary habitat includes a significant shrub layer that is typically found within chat breeding territories. Secondary habitat is riparian habitat with a less developed shrub layer. Few chats have been detected in the Planning Area, and thus the majority of suitable riparian habitat is believed to be unoccupied by this species. There is no standard replacement ratio for losses of yellow-breasted chat habitat. However, chat-specific mitigation is generally not required for unoccupied habitat. The species occurs in low densities in the Planning Area; however, complete surveys of the Planning Area have not been conducted. Because removal of most of its riparian habitat is likely not occupied, mitigation will be provided by restoring and managing 1 acre of primary habitat for each acre of affected primary habitat.</p> <p><b>Conservation Provided:</b> Conservation of yellow-breasted chat is directed at increasing the extent of primary and secondary nesting habitats to ensure that the existing abundance of chat in the Planning Area is sustained and sufficient riparian habitat is maintained to support potential future increases in its abundance and distribution. At least 3,000 of the 5,000 acres of restored riparian habitat will include a midstory layer that supports primary nesting and migratory habitat and habitat that does not support a sufficient midstory canopy will support secondary nesting and migratory habitat. It is anticipated that much of the restored riparian habitat will be restored in large wide patches that will minimize the potential for cowbird nest parasitism which is believed to be a stressor on the species. The proposed restoration of yellow-breasted chat riparian habitat will increase the extent of available habitat in the Planning Area by approximately 30 percent and, following BDCP implementation, approximately 37 percent of its habitat will be under protection. This substantial increase in available managed habitat is expected to sustain the existing Planning Area populations and providing the basis for future increases in its abundance and distribution.</p>
<i>Primary nesting and migratory habitat [includes former Suisun Marsh category]</i>	310	0	310	0	310	0	≥2,690	
<i>Secondary nesting and migratory habitat</i>	460	1	460	0	0	0	≤2,000	
Western burrowing owl								<p><b>Mitigation:</b> Impacts on western burrowing owl result from BDCP actions that remove modeled burrowing owl nesting and foraging habitat. BDCP actions are estimated to permanently affect 21,575 acres of western burrowing owl habitat, which consists of grasslands, managed wetlands, and cultivated lands. The value of foraging cover types is highly variable, particularly in agricultural landscapes. Standard DFG burrowing owl mitigation is assessed on the presence of occupied breeding or wintering burrows. However, because the entire Planning and ROA areas were not sufficiently surveyed for the presence of burrowing owls, mitigation is proposed on the basis of habitat value. Mitigation for effects on high value grassland habitat will be provided by preserving 1 acre of grassland habitat for each acre of affected habitat and 0.5 acre of grassland or pastureland habitat will be preserved for each acre of affected moderate value habitat (i.e., primarily pasturelands). Mitigation for low value cultivated lands is</p>

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								<p>not proposed because they are likely to be largely unoccupied and it is expected that the proposed habitat mitigation will substantially exceed actual impacts.</p> <p><b>Conservation Provided:</b> Conservation of western burrowing owl is directed at maintaining a suitable habitat landscape across the Planning Area and Suisun Marsh and adjacent lands through strategic acquisition and management of grassland and agricultural preserves. Conservation will focus on preservation of grasslands that support moderate to high habitat value and that are connected to burrowing owl habitats adjacent to the Planning Area to preclude further fragmentation of important habitats. The distribution of high and moderate value habitat in the Planning Area is consistent with the distribution of burrowing owl occurrences. Few burrowing owls have been documented from low value habitat areas. At least 2,000 acres of moderate value habitat will be conserved through preservation of Swainson's hawk and white-tailed kite foraging habitats that provide a moderate level of function for burrowing owl.</p> <p>Conserved habitat will located within or near to known occupied habitat and will be managed to increase the availability of nesting burrows and prey species. Habitat will be preserved in large patches that are connected to existing habitat areas and will be managed in conjunction with preserved mitigation habitats. An estimated 54 percent of the high value, 32 percent of the moderate value, and 16 percent of the low value habitat is currently protected. Through preservation of an additional 8,000 acres of currently unprotected high value grassland habitat, a total of 66 percent of the high value burrowing owl habitat in the Planning Area will be under protected status. Through preservation of additional acres of unprotected moderate value habitat, it is expected that up to 48 percent of the moderate value habitat in the Planning Area will be under protected status. Sufficient low value habitat, primarily agricultural lands, are expected to persist in the Planning Area over time to support occasional occurrences of burrowing owls in the central and south Delta and thus there is no target for replacement or conservation of low value habitat for burrowing owls. Implementation of the proposed mitigation and conservation actions are expected to sustain existing burrowing owl populations within and adjacent to the Planning Area and to provide sufficient habitat area to allow for future population growth.</p>
<i>High-value habitat</i>	3,430	2	3,430	3,430 CZ 1, 2, 4, 7, 8, 9	0	4,570	0	
<i>Moderate-value habitat</i>	3,780	20	3,800	1,900 CZ: 1-9 and/or 11	0	>2,000 CZ: 1, 2, 4, and/or 11	0	
<i>Low-value habitat</i>	14,370	1,620	15,990	0	0	0	0	
Greater sandhill crane								<p><b>Mitigation:</b> Impacts on greater sandhill crane result from BDCP actions that remove modeled greater sandhill crane wintering habitat. Modeled habitat located in the secondary use area is only occasionally used by a few individuals among the entire Delta population which concentrates in the primary use area. Consequently, mitigation is not proposed removal of foraging habitats in the secondary use area because they are largely unoccupied and impacts on foraging habitat are not expected to impact or alter the behaviors of greater sandhill crane. BDCP actions are estimated to permanently affect 3,915 acres of greater sandhill crane foraging habitat, which consists of grasslands, managed wetlands, and cultivated lands. The value of foraging cover types is highly variable,</p>

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								<p>particularly in agricultural landscapes. To address this variability, the relative value of each cover type was estimated to more accurately reflect use of the landscape, the distribution of the species, and to develop appropriate conservation strategies. Foraging cover types were classified into four ranking categories based on documented use and estimated relative value, from 0.1 to 1.0. Acres of each type were converted to habitat units by multiplying the actual acres by the value ranking. Based on this method, the total habitat units of impacted foraging habitat is 2,846. There are no standard guidelines for mitigating loss of greater sandhill crane wintering habitat. To fully mitigate effects on greater sandhill crane wintering habitat, impacts on greater sandhill crane foraging habitat value will be mitigated by preserving foraging habitat that replaces the affected foraging habitat value. Based on this approach, 2,846 and 5,692 acres of foraging habitat will be annually preserved. Preserved foraging habitat may be comprised of grassland, managed wetland, and cultivated lands that are located within the primary use area. If it is desirable to preserve lands that support lesser per acre foraging habitat value for greater sandhill crane to achieve other covered habitat species objectives, additional lands may be required to achieve mitigation.</p> <p><b>Conservation Provided:</b> Conservation of greater sandhill crane is directed at preserving and restoring wintering habitat sufficient to sustain the wintering population into the future and provide for future growth of the population. At least 2,000 acres of preserved Swainson's hawk and white-tailed kite foraging habitat that also supports high functioning greater sandhill crane foraging habitat will be located within the primary use area. An estimated 36 percent of greater sandhill crane foraging habitat in the primary use area is currently preserved. Following implementation of BDCP actions, at least 42 percent of primary use zone habitats will be protected. Conserved habitat will be managed in conjunction with habitat preserved for mitigation to ensure an appropriate mix and distribution of foraging habitat types that is most beneficial to the crane. Greater sandhill crane winter roosting habitats are limited within the Planning Area and roosting cranes are intolerant of disturbances and readily will abandon roosts if disturbed. Lack of suitable and dependable roosting habitat limits the ability of cranes to use foraging habitats. To address this species' requirement, at least 2 roost sites of at least 160 acres each in proximity to preserved foraging habitats will be created to ensure the future availability of sufficient wintering habitat (preserved and non-preserved) to support the portion of the Central Valley population that winters in the Planning Area. Roost sites will be located in areas that are not subject to disturbances and will be designed to minimize the accessibility of roost sites to predators.</p> <p>Preserved agricultural habitats would be managed to provide high quality foraging habitat and to minimize human disturbances during the crane wintering period. Preserved foraging habitat patches would be at least 160 acres in size to minimize the potential effects of human-associated visual and noise disturbances adjacent to preserved foraging habitat on crane foraging behaviors. Approximately 88 percent of foraging habitat within the primary use area is located below sea level and potentially subject to future loss with levee failures. Consequently, at least 1,000 acres of the preserved wintering habitat will be located at elevations above sea level. Additionally, least and estimated 5,000 acres of crane foraging habitat in the secondary use zone will be preserved to provide foraging habitat for Swainson's hawk and white-tailed kite. Although preservation of habitat in the secondary zone will not likely benefit the species at this time, maintaining these habitats will ensure alternate wintering areas are available for the crane should catastrophic loss of primary zone habitats result from levee failures and will ensure the availability of foraging habitat in support of any future population growth.</p>
<i>Primary use area</i>	3,920	815	4,730	2,850-5,700 CZ: 3, 4, 5, and/or 6	0	>2,000 CZ: 3, 4, 5, and/or 6	320	
<i>Secondary use</i>	276	338	614					

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<i>area</i>								
California black rail	5,160	0	5,160	0	5,160 CZ: 1, 4, 7, and/or 11	0	11,810-21,310 CZ: 1, 4, 7, and 11	<p><b>Mitigation:</b> All but 6 acres of the impacted California black rail modeled marsh habitat will be affected by restoration of tidal habitats. Impacts on California black rail habitat result from restoration of tidal habitats in the removes its modeled habitat. The extent of rail habitat is based on the distribution of vegetation types and associations; however, it is not based on other habitat elements, particularly water depth that is essential to rail occupancy. Consequently, impacts based on modeled habitat likely substantially over estimate impacts relative to impacts on its actual habitat, which occurs as patches within the modeled habitat. Habitat will be restored in a manner that minimizes temporary effects of habitat loss on the species. Habitat will be restored in larger patches than impacted patches of habitat that are generally fragmented by dikes, roads, unsuitable habitat areas, and other infrastructure. Suitable upland flood refugia habitat will also be provided as a component of the restored marsh. Non-native predators (e.g., feral cats) are believed to be an important stressor on this species. Management of mitigation habitats will include control of non-native predators to help maintain the species abundance. Mitigation habitat will also be monitored to assess the status of the species and will be adaptively managed to ensure high habitat function for the black rail. It is expected that habitat conditions for the species will be improved and more sustainable in its Suisun Marsh post-restoration, creating opportunities for population expansion.</p> <p>There are no standard habitat mitigation guidelines for impacts on black rail habitat. Mitigation for projects affecting black rail habitat typically provide 1 to 4 acres of habitat for each affected acre of habitat. Because impacts result from restoration of the natural marsh conditions that historically supported the species and, as such, are expected to support habitat patches of higher function than habitat patches that would be affected, mitigation is provided by restoring and managing 1 acre of restored tidal marsh for each acre of impacted habitat.</p> <p><b>Conservation Provided:</b> Conservation of California black rail is directed at restoring tidal marsh conditions that historically supported rail habitats in the Planning Area and Suisun Marsh. Within the Planning Area, existing habitats are limited primarily to small and isolated remnant patches of emergent vegetation along Delta channels. Because opportunities for conserving species habitats along existing tidal channels is limited by levees, conservation will be provided through restoration of large tracts of brackish and freshwater tidal marsh plain throughout the Planning Area and Suisun Marsh where such restoration is practicable. Conservation will be provided through restoration of an estimated 11,810-21,310 acres of tidal marsh designed and managed to support patches of species habitat as described for restored mitigation habitat. Restoration of tidal marsh in Suisun Marsh is consistent with and helps achieve the California black rail objectives of the draft tidal marsh ecosystems recovery plan (USFWS 2010). Restored mitigation and conservation habitats will be contiguous and managed to provide greater habitat functions that supported by existing habitat areas. The proposed restoration and ongoing management of tidal marsh habitat for this species is expected to provide for a sustainable and expanding population of California black rail.</p>
California clapper rail	400	0	400	0	400 CZ: 11	0	3,280-4,430 CZ: 11	<p><b>Mitigation:</b> Modeled California clapper rail marsh habitat will only be affected by BDCP tidal habitat restoration actions in Suisun Marsh. The extent of rail habitat is based on the distribution of vegetation types and associations; however, it is not based on other habitat elements, particularly proximity to tide channels that supports preferred nesting habitat. Consequently, impacts based on modeled habitat likely over estimate impacts relative to impacts on its actual habitat, which occurs as patches within the modeled habitat. Habitat will be restored in a manner that minimizes temporary effects of habitat loss on the species. Habitat will be restored in larger patches than impacted patches of habitat that are generally fragmented by dikes, roads, unsuitable habitat areas, and other infrastructure. Suitable upland flood refugia habitat will also be provided as a component of the restored marsh. Non-native predators (e.g., feral cats) are believed to be an important stressor on this species. Management of mitigation</p>

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
								<p>habitats will include control of non-native predators to help maintain the species abundance. Mitigation habitat will also be monitored to assess the status of the species and will be adaptively managed to ensure high habitat function for the black rail. It is expected that habitat conditions for the species will be improved and more sustainable in its Suisun Marsh post-restoration, creating opportunities for population expansion.</p> <p>There are no standard habitat mitigation guidelines for impacts on clapper rail habitat. Mitigation for projects affecting clapper rail habitat typically provide 1 to 4 acres of habitat for each affected acre of habitat. Because impacts result from restoration of large contiguous patches of natural marsh that historically supported the species and, as such, are expected to support habitat patches of higher function than habitat patches that would be affected, mitigation is provided by restoring and managing 1 acre of restored tidal marsh for each acre of impacted habitat.</p> <p><b>Conservation Provided:</b> In the vicinity of the Planning Area, opportunities for the conservation of California clapper rail are limited to Suisun Marsh (i.e., Conservation Zone 11) because other populations are associated with marshes along San Francisco and San Pablo Bays. Conservation of California clapper rail is directed at restoring tidal marsh conditions that historically supported the rail in Suisun Marsh. Conservation will be provided through restoration of an estimated 3,279-4,429 acres of tidal marsh in large tracts designed and managed to support patches of species habitat as described for restored mitigation habitat. Large tracts of marsh habitat (&gt;247 acres) support higher densities of clapper rail than smaller patches (LSA 2007). Restoration of tidal marsh in Suisun Marsh is consistent with and helps achieve California clapper rail objectives of the draft tidal marsh ecosystems recovery plan (USFWS 2010). Restored mitigation and conservation habitats will be contiguous and managed to provide greater habitat functions that supported by existing habitat areas. The proposed restoration and ongoing management of tidal marsh habitat for this species is expected to provide for a sustainable and expanding population of California clapper rail in Suisun Marsh.</p>
White-tailed kite								<p><b>Mitigation:</b> Impacts on white-tailed kite result from BDCP actions that remove modeled white-tailed kite nesting and foraging habitat. BDCP actions are estimated to permanently affect 36,071 acres of white-tailed kite foraging habitat, which consists of grasslands, managed wetlands, and cultivated lands. The value of foraging cover types is highly variable, particularly in agricultural landscapes. To address this variability, the relative value of each cover type was estimated to more accurately reflect use of the landscape, the distribution of the species, and to develop appropriate conservation strategies. Foraging cover types were classified into four ranking categories based on documented use and estimated relative value, from 0.1 to 1.0. Acres of each type were converted to habitat units by multiplying the actual acres by the value ranking. Based on this method, the total habitat units of impacted foraging habitat is 23,642. There are no standard guidelines for mitigating loss of white-tailed kite foraging habitat; however, mitigation is generally not recommended if the species has not been detected. While a substantial portion of the Planning Area has been surveyed for this species in the last several years, including 2009 DWR surveys, portions have not been surveyed. Although survey data is incomplete, the available data indicates that white-tailed kite nests in substantially smaller densities than Swainson's hawk (331 nesting Swainson's hawk territories have been located in the Planning Area compared to the 20 known kite nest sites). Because densities are low, it is likely that much of the affected foraging habitat is unoccupied and, therefore, would not affect the species. Consequently, impacts on foraging habitat value for the white-tailed kite will be mitigated by preserving habitat that supports 50 percent of the impacted foraging habitat value. Based on this approach, 11,821 and 23,642 acres of foraging habitat will be annually preserved. Preserved foraging habitat may be comprised of grassland, managed wetland, and cultivated lands that are located within Conservation Zones 1-9 and/or 11. If it is desirable to preserve lands that support lesser per acre foraging habitat value for white-tailed kite to achieve other covered habitat species objectives, additional lands may be required to achieve mitigation.</p>

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
								<p>Approximately 580 acres of modeled white-tailed kite nesting habitat could be impacted primarily as a result of tidal habitat restoration. This assessment assumes that all existing riparian habitat will be removed within the potential footprint of restored tidal marshes. The actual impact is expected to be less because restored tidal habitats will be designed to retain riparian habitat where possible. For the reasons described for impacts on foraging habitat, much of the affected nesting habitat are likely unoccupied and thus removal unoccupied nesting habitat would not affect the kite. Consequently, mitigation for nesting habitat impacts will be provided by restoring 0.5 acre of riparian habitat that supports suitable nesting trees for each acre of habitat removed. Riparian nesting habitat will be restored in conjunction with restored tidal and floodplain habitats and enhanced channel margin habitats. It is anticipated that this restoration will occur in Conservation Zones 1-7 and 11. Mitigation habitats will be managed to minimize human disturbances to active nest sites during the breeding season.</p> <p><b>Conservation Provided:</b> Conservation of white-tailed kite is directed at maintaining a suitable nesting and foraging landscape across the Planning Area and Suisun Marsh and adjacent lands through strategic acquisition and management of grassland, seasonal wetland, and agricultural preserves and restoring at least 4,000 acres of riparian nesting habitat, much of which will be located near preserved foraging habitats. Conserved nesting and foraging habitat will be located, designed, and managed as described above for mitigation habitats. At least █ percent of preserved foraging habitat will be located at elevations above sea level to ensure that foraging habitat is maintained for white-tailed kites should potential future Delta levee failures result in inundating substantial foraging habitat area. It is anticipated that all of the restored riparian habitat will be located within foraging flight distance to preserved foraging habitat, thus increasing the functions of both types of habitat for the species. Preserved grasslands and agricultural lands will be managed to provide high value white-tailed kite foraging habitat. Conservation will occur in cooperation and in conjunction with neighboring and overlapping HCP/NCCPs to ensure that conservation actions occur where they most benefit the regional white-tailed kite population and where they are compatible with conservation of other agricultural and riparian-associated species. It is also expected that ongoing agricultural land uses within and adjacent to the Planning Area will also continue to support foraging habitat for white-tailed kite nesting and wintering in the Planning Area. The proposed conservation is expected to sustain the existing population of white-tailed kites and provide for future increases in its abundance and distribution within and adjacent to the Planning Area.</p> <p>An estimated 25 percent of white-tailed kite foraging habitat within the Planning Area is currently preserved on state and federal wildlife refuges, other state-owned lands, and mitigation banks and is expected to remain suitable white-tailed kite foraging habitat. Following implementation of BDCP actions, an estimated 27 and 32 percent of the total available foraging habitat will protected and the extent of nesting habitat will be increased by approximately 25 percent.</p>
<i>Breeding habitat</i>	580	0	580	0	290	0	3,710	
<i>Foraging habitat</i>	36,070	1,720	37,790	11,820 to 23,640 CZ 1-9, and/or 11	0	10,200-16,400 CZ 1-9, and/or 11	0	
Swainson's hawk								<p><b>Mitigation:</b> Impacts on Swainson's hawk result from BDCP actions that remove modeled Swainson's hawk nesting and foraging habitat. BDCP actions are estimated to permanently affect 30,952 acres of Swainson's hawk foraging habitat, which consists of grasslands, managed wetlands, and cultivated lands. The value of foraging</p>

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
								<p>cover types is highly variable, particularly in agricultural landscapes. To address this variability, the relative value of each cover type was estimated to more accurately reflect use of the landscape, the distribution of the species, and to develop appropriate conservation strategies. Foraging cover types were classified into four ranking categories based on documented use and estimated relative value, from 0.1 to 1.0. Acres of each type were converted to habitat units by multiplying the actual acres by the value ranking. Based on this method, the total habitat units of impacted foraging habitat is 18,022. DFG typically requires the preservation of 1 acre of foraging habitat for each acre of foraging habitat removed. To mitigate the loss of habitat functions, it is anticipated that foraging habitat with per acre foraging habitat functions of 1.0 to 0.5 will be preserved. Based on this approach, 18,022 to 36,044 acres of foraging habitat will be annually preserved. Preserved foraging habitat may be comprised of grassland, managed wetland, and cultivated lands that are located within foraging flight distances of occupied nesting habitat within Conservation Zones 1-9 and/or 11. If it is desirable to preserve lands that support lesser per acre foraging habitat value for Swainson's hawk to achieve other covered habitat species objectives, additional lands may be required to achieve mitigation.</p> <p>Approximately 420 acres of modeled Swainson's hawk nesting habitat could be impacted primarily as a result of tidal habitat restoration. This assessment assumes that all existing riparian habitat will be removed within the potential footprint of restored tidal marshes. The actual impact is expected to be less because restored tidal habitats will be designed to retain riparian habitat where possible. Mitigation for nesting habitat impacts will be provided by restoring 1 acre of riparian habitat that supports suitable nesting trees for each acre of habitat removed. Riparian nesting habitat will be restored in conjunction with restored tidal and floodplain habitats and enhanced channel margin habitats. It is anticipated that this restoration will occur in Conservation Zones 1-7 and 11. Mitigation habitats will be managed to minimize human disturbances to active nest sites during the breeding season.</p> <p><b>Conservation Provided:</b> Conservation of Swainson's hawk is directed at restoring high functioning nesting habitat that is maintained and managed in conjunction with preserved mitigation foraging habitats such that a suitable nesting and foraging landscape across the Planning Area sufficient to sustain the Planning Area's Swainson's hawk nesting and wintering populations. Nesting Swainson's hawks are widely distributed throughout the Planning Area and surrounding lands. Breeding densities are high in some areas, particularly the north, east, and south Delta, and less so in the Central Delta and south Yolo Bypass. The majority of the land within the Planning Area is considered suitable Swainson's hawk foraging habitat, although actual value varies depending on annual and seasonal crop patterns and practices. Of the 314 nesting records since 2000, at least 220 of these are considered independent and are potentially active in any given year<sup>1</sup>. The Swainson's hawk forages widely during the breeding season, but forages only in those habitats that are suitable annually or seasonally. For example, areas planted to corn, one of the most abundant crop types in the Central Delta, are used minimally due to the lack of prey accessibility. Thus, only some portion of the total affected acres are used by foraging Swainson's hawks in any given year.</p> <p>At least █ percent of preserved foraging habitat will be located at elevations above sea level to ensure that foraging habitat is maintained for Swainson's hawks should potential future Delta levee failures result in inundating substantial foraging habitat area. It is anticipated that all of the restored riparian habitat will be located within foraging flight distance to preserved foraging habitat, thus increasing the functions of both types of habitat for the species. Preserved grasslands and agricultural lands will be managed to provide high value Swainson's hawk</p>

<sup>1</sup>The total of 314 nesting records may include some nesting territories counted more than once due to different surveys and survey years and the use of alternative nesting locations by individual nesting pairs. To account for this, each reported nesting site was examined for independence. The minimum of 220 nesting territories potentially active in any given year was derived from 97 sites reported during 2009 DWR surveys of the Central Delta, 56 sites reported from 2007 and 2008 surveys conducted by Estep in Yolo and Sacramento Counties, and an additional 67 sites reported in CNDDDB since 2000, most of which were from surveys conducted for the Solano County HCP or from DWR surveys in the South Delta.

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
								<p>foraging habitat. Conservation will occur in cooperation and in conjunction with neighboring and overlapping HCP/NCCPs to ensure that conservation actions occur where they most benefit the regional Swainson's hawk population and where they are compatible with conservation of other agricultural and riparian-associated species. It is also expected that ongoing agricultural land uses within and adjacent to the Planning Area will also continue to support foraging habitat for Swainson's hawks nesting and wintering in the Planning Area.</p> <p>An estimated 22 percent of Swainson's hawk foraging habitat within the Planning Area is currently preserved on state and federal wildlife refuges, other state-owned lands, and mitigation banks and is expected to remain suitable Swainson's hawk foraging habitat. Following implementation of BDCP actions, between 26 and 29 percent of the total available foraging habitat and the extent of nesting habitat will be increased by approximately 35 percent. The proposed conservation is expected to sustain the existing population of Swainson's hawk and provide for future increases in its abundance and distribution within and adjacent to the Planning Area.</p>
<i>Foraging habitat</i>	29,240	1,720	30,960	20,020 to 36,040 CZ 1-9, and/or 11	0	0	0	
<i>Nesting habitat</i>	420	0	420	0	420 CZ 1-9, and/or 11	0	3,580 CZ 1-9, and/or 11	
Giant garter snake								<p><b>Mitigation:</b> Impacts on giant garter snake result from BDCP actions that remove modeled giant garter snake habitat within its primary use zone. BDCP actions are not expected to have any direct effects on the two population centers that occur within the Planning Area identified in the USFWS draft recovery plan (Caldoni Marsh/White Slough and Yolo-Willow Slough populations). Modeled habitat located outside of the primary use zone are either not occupied by the species or may support individuals sporadically under certain conditions such as flood events that flush individuals into the central Delta. Mitigation for permanent and temporary losses of GGS habitat will be achieved by applying the standard USFWS compensation formula as specified in the USFWS guidelines (U.S. Fish and Wildlife Service 1999) provide for:</p> <ul style="list-style-type: none"> <li>• preservation of one acre of aquatic habitat and at least 2 acres of upland habitat adjacent to the preserved aquatic habitat for every acre of aquatic habitat removed, and</li> <li>• preservation of one acre of upland habitat in addition to the upland habitat preserved as a result of lost aquatic habitat for every acre of upland habitat removed.</li> </ul> <p>Preserved mitigation habitat will be located within the modeled primary use zone in Conservation Zones 1, 2, and 4. Preserved habitat will be comprised of known or potentially occupied habitat or connected to known occupied or potentially occupied habitat areas such that functional habitat corridors that provide for movement of giant garter snakes to and from the preserved habitat are provided. Preserved aquatic habitat will be provided through preservation of water conveyance ditches within preserved cultivated lands and restoration of tidal marsh in locations with tidal ranges that are suitable for snake occupancy. Preserved upland habitat will be comprised of modeled upland agricultural habitats and transitional uplands that will be preserved in conjunction with restoration of tidal habitats. Preserved upland mitigation habitats will be managed to maintain or improve vegetative cover and aestivation habitat conditions for the snake.</p>

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
								<p><b>Conservation Provided:</b> Conservation of giant garter snake will be provided through protection and expansion of the two primary population centers in the Planning Area (Caldoni Marsh-White Slough and Yolo-Willow Slough populations), and supplemental enhancement of other aquatic and associated upland habitats throughout the Planning Area in conjunction with achieving objectives for tidal and non-tidal freshwater marsh, grassland, and cultivated habitats. Concentrating on protection and enhancement of the two population centers will focus resources to achieve maximum conservation benefit and will help to meet USFWS recovery goals for those designated subpopulations.</p> <p>A substantial portion of the Yolo-Willow Slough population and Caldoni-White Slough population is currently preserved on state refuges. Preservation of at least 1,000 acres of additional unprotected habitat in each of these areas will help ensure the continued existence of these populations. In addition, restoration of 400 acres of non-tidal marsh among these to habitat areas will substantially increase connectivity among existing occupied habitat areas and provide the basis for future expansion of their distribution and abundance. Preservation and management of habitat areas adjacent to occupied habitats will also protect occupied habitat areas from potential impacts associated with adjacent land uses. These preserves will also protect and enhance cultivated habitats for other covered species (e.g., Swainson's hawk). If site specific planning to design the preserves indicates that the extent of the proposed preservation is not necessary to sustain and expand these populations, some of the proposed preservation and restoration may be directed towards securing populations adjacent to the Planning Area (e.g., the Badger Creek population) consistent with achieving objectives of adjacent conservation plans.</p> <p>Restoration of tidal habitats, particularly in potentially occupied habitat areas in Conservation Zones 2 and 4, will also increase the extent of suitable giant garter snake breeding and foraging habitat. Meeting the tidal marsh restoration objectives is expected to substantially increase aquatic and associated upland habitat for giant garter snake throughout the Planning Area and preservation of cultivated habitats in Zones 2 and 4 to meet objectives for Swainson's hawk and greater sandhill crane are expected to provide opportunities for enhancing north-south movement corridors within the Yolo Bypass and east of the canal alignment between Stone Lakes National Wildlife Refuge and the Caldoni Marsh-White Slough area. Within the Yolo Bypass, preservation of the existing extent of rice lands that could be affected by proposed Fremont Weir operations or restoration of wetlands that replace any lost habitat functions of rice lands will sustain the abundance and distribution of snakes that are known to inhabit cultivated portions of the Bypass. Preservation of cultivated habitats will also protect and enhance upland aestivation habitat for giant garter snake within its modeled range.</p>
<i>Primary Zone: Aquatic breeding, foraging and movement</i>	300	0	300	300 CZ 1, 2, 4, and/or 5	0	≥6,600 CZ: 2	400 CZ: 2 and 4	
<i>Primary Zone; Upland aestivation</i>	6,420	80	6,500	7,100	0		0	

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
<i>and movement</i>				CZ 1, 2, 4, and/or 5				
Western pond turtle								<p><b>Mitigation:</b> BDCP actions are expected to affect modeled western pond turtle aquatic breeding, dispersal, and upland nesting and overwintering habitat. All but approximately 20 acres of the affected aquatic habitat is impacted as a result of tidal habitat restoration. In the absence of standard guidelines for mitigating impacts on western pond turtle habitat, mitigation will be provided through preserving or restoring 1 acre of aquatic, upland nesting and overwintering, and dispersal habitat for each acre of each affected habitat type. Impacts on dispersal habitat result only from the development footprint of new conveyance facilities; restored tidal and other habitats that impact upland dispersal habitats also function as dispersal corridors and, therefore, there will be no net loss of dispersal habitat from habitat restoration actions. Impacts on aquatic habitat will be mitigated through restoration of tidal marsh plain and adjacent shallow subtidal habitat components of restored tidal habitats. Impacts on modeled upland nesting and overwintering habitat will be mitigated through a combination of preserving grassland habitat and restoring riparian habitats that function as nesting and overwintering habitat. Dispersal habitat will be mitigated through preservation of grassland and cultivated habitats near habitats that are affected by construction of conveyance facilities.</p> <p><b>Conservation Provided:</b> Conservation of western pond turtle will be directed at restoring and preserving its aquatic and upland nesting and overwintering habitats to sustain the existing Planning Area and Suisun Marsh populations and provide for future increases in their abundance and distribution. Aquatic habitat will be provided through restoration of tidal marsh plain and adjacent shallow subtidal habitats that are expected to support extensive patches of habitat and 400 acres of non-tidal marsh that will be located in occupied giant garter snake habitat areas. Restoration of pond turtle aquatic habitat is expected to increase the extent of this habitat type in the Planning Area and Suisun Marsh by up to 64 percent relative to current conditions. Upland nesting and overwintering habitat will be provided through a combination of preserving grassland habitats and restoring riparian habitat. A substantial amount of restored riparian habitat is expected to be restored adjacent to restored marshes, thus ensuring proximity of nesting and overwintering habitat to its aquatic habitat. Specific conservation targets are not established for upland dispersal habitat because this habitat type is ubiquitous within the Planning Area and Suisun Marsh. Extensive preservation of grassland and cultivated habitats above that required for pond turtle mitigation to meet habitat objectives of other covered species, however, will also conserve this species dispersal habitat.</p>
<i>Aquatic habitat</i>	5,010	1	5,010	0	5,010 CZ: 1, 4, 7, 8, and/or 11	0	43,980-46,770 CZ: 1, 2, 4, 7, 8, and 11	
<i>Dispersal habitat</i>	2,070	1,930	4,000	4,000	0	0	0	
<i>Upland nesting and overwintering</i>	4,220	2	4,230	2,230 CZ: 1, 4, 7, 8, and/or 11	2,000 CZ: 1, 4, 7, 8, and/or 11	≥3,000 CZ: 1, 4, 7, 8, and/or 11	3,000 CZ: 1, 4, 7, 8, and/or 11	
California red-legged frog								<p><b>Mitigation:</b> California red-legged frog habitat will only be impacted by construction of conveyance facilities near Clifton Court Forebay. Standard guidelines for mitigating impacts on red-legged frog habitat have not been developed. To mitigate the effects on modeled stream aquatic habitat, affected stream aquatic habitat (1 acre) will be mitigated through preservation of at least 0.5 mile of modeled stream in Conservation Zone 8, including 25 feet</p>

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
								<p>of adjacent riparian/upland habitat extending from each side of stream channel banks (3 acres total), that is connected to watersheds occupied by the frog. Upland cover and dispersal habitat will be mitigated through preservation of 200 acres of grassland habitat connected to the preserved aquatic habitat. Preserved habitat will be located such that it provides connectivity to occupied habitats adjacent to the Planning Area. The preserved habitat will be managed to increase the abundance of squirrel burrows to increase the availability of aestivation sites and to increase the habitat function of any riparian habitat adjacent to the preserved stream channel.</p> <p>Affected foraging and dispersal habitat is comprised of cultivated lands on the valley floor that are adjacent to and generally east of uncultivated grasslands. While red-legged frogs are occasionally known to travel through cultivated habitats, there is no indication that this area is either occupied or is accessible for red-legged frog use. The cultivated lands are also not transitional to other potentially occupied habitats on the valley floor. Therefore, the removal of cultivated lands in the vicinity of uncultivated grasslands (as defined in the California red-legged frog habitat model) is unlikely to affect the species and thus no mitigation for this impact is proposed.</p> <p><b>Conservation Provided:</b> The Planning Area supports California red-legged frog habitat that is at the margin of its range in Contra Costa County. Consequently, conservation of California red-legged frog is focused on preserving its intact riparian and grassland upland cover and dispersal habitat linking to its aquatic breeding habitat within the Planning Area and to occupied habitat areas adjacent to the Planning Area. Preserved upland cover and dispersal habitat will be located such that it encompasses as much aquatic stream breeding habitat as possible. The proposed conservation will preclude potential future fragmentation of the highest functioning frog habitat in the Planning Area and will maintain habitat area to sustain the existing population and to maintain connectivity with occupied core populations adjacent to the Planning Area. Intact habitat areas that are linked to core occupied habitats are only present in Conservation Zone 8 (existing modeled habitat in Conservation Zones 9 and 10 is highly fragmented). Approximately 3,830 acres of upland cover and dispersal habitat is present in Conservation Zone 8 of which approximately 620 acres are currently preserved (16 percent). The proposed preservation of grassland habitat would be located such that it encompasses stream corridors that support breeding habitat. Following preservation to mitigate BDCP impacts and provide for species conservation, approximately 42 percent of habitat in Conservation Zone 8 that links to occupied habitat outside of the Planning Area would be preserved.</p>
<i>Aquatic habitat</i>	1	0	1	3	0			
<i>Upland cover and dispersal habitat</i>	190	0	190	200 CZ: 8	0	800 (including encompassed stream aquatic habitat)	0	
<i>Dispersal habitat</i>	670	0	670	0	0	0	0	
Western spadefoot toad								<p><b>Mitigation:</b> Impacts on western spadefoot toad result from BDCP actions that remove modeled spadefoot toad habitat. Mitigation for impacts on vernal pool complex habitats, which supports spadefoot toad breeding habitat, will be achieved by applying USFWS biological opinion mitigation guidelines recommending preservation of 3 acres of existing habitat and restoration of 2 acres of vernal pool habitat. Preserved and restored habitats will be located within modeled western spadefoot habitats (occurrence data for this species is insufficient to direct mitigation to known occupied habitats). Existing unprotected vernal pool complex terrain will be preserved and managed in conjunction with BDCP preserved grassland habitats in Conservation Zones 1, 8, and 11. Restored</p>

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
								<p>vernal pool complex terrain Restored vernal pool complex terrain will be designed to provide high breeding habitat function for tiger salamander and will be restored in these same Conservation Zones on lands that historically supported fully functioning vernal pool habitats. Habitat will be preserved and restored in the largest possible patch sizes and management of preserved and restored vernal pool complex terrain (e.g., livestock grazing) will be designed to enhance habitat functions for western spadefoot and other associated covered vernal pool-associated species.</p> <p>Mitigation for impacts on terrestrial habitat will be provided by preservation of grassland habitat that is within or connected to modeled western spadefoot habitat. Terrestrial habitat affected by conveyance construction in the east Delta (188 acres) is highly fragmented and not believed to be occupied by the species; consequently mitigation habitat will be preserved in or near large contiguous and connected tracts of habitat in Conservation Zones 1, 8, and/or 11 to ensure maximum benefit to the species. Mitigation habitat will be preserved and managed in conjunction with preservation of conserved spadefoot vernal pool complex and grassland habitats. The preserved habitat will be managed to increase the abundance of squirrel burrows to increase the availability of aestivation sites.</p> <p><b>Conservation Provided:</b> Vernal pool complex terrain supporting spadefoot toad vernal pool breeding habitat is present in Conservation Zones 1, 2, 4, 8, 9, and 11 along the upper elevation margins of the Delta. Opportunities for large scale conservation of spadefoot toad breeding habitat within the Planning Area, however, are located only in Conservation Zones 1, 8, and 11. Vernal pool complex terrain in Conservation Zones 2 and 4 is almost entirely under protected status (99 percent) and vernal pool complex terrain in Conservation Zone 9 (approximately 120 acres) is located in the vicinity of Discovery Bay and is largely fragmented by development and cultivated lands. Habitat will be preserved in the largest possible patch sizes, will be located such that it is within or connected to occupied tiger salamander habitat, and will be contiguous with preserved mitigation habitat. Conservation of breeding habitat will be provided through preservation of 135 acres and restoration of 90 acres of vernal pool terrain that supports modeled spadefoot toad habitat. Conserved habitat will be designed and managed as described for mitigation habitat. At least 50 acres of habitat (for mitigation or conservation) will be preserved in Conservation Zone 8 and 50 acres in Conservation Zone 11. Management of preserved vernal pool complex terrain (e.g., livestock grazing) will be designed to enhance tiger salamander breeding habitat functions. Habitat will be preserved in conjunction with preserved grassland and alkali seasonal wetlands that will also be preserved in these conservation zones.</p> <p>Upland terrestrial cover and aestivation habitat will be preserved in Conservation Zones 1, 8, and 11. Upland habitat will be comprised of grassland that encompasses preserved aquatic breeding habitats and that is within or connected to occupied tiger salamander habitat. To the extent possible, preserved upland habitat will be located such that intermittent stream breeding habitats that bisect preserved grasslands are also preserved and managed to benefit the toad. Connections to occupied habitat will be of sufficient width to provide for the movement of salamanders to and from occupied habitat areas. Preserved grassland habitats will be managed to provide appropriate vegetative conditions to facilitate salamander movement and reduce predation exposure and to maintain or increase the abundance of ground squirrels and other fossorial species to improve the availability of suitable aestivation sites. The proposed preservation, restoration, and preservation of spadefoot toad breeding and upland habitats within or connected to occupied habitats is expected to sustain spadefoot toad populations within the Planning Area and provide for the increase in abundance and distribution of spadefoot toad within and near the Planning Area. Following completion of conservation actions, approximately 69 percent of spadefoot toad vernal pool complex breeding habitat and 74 percent of its upland habitat will be protected.</p>

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
<i>Aquatic breeding habitat</i>	50	0	50	150 CZ: 1, 8, and 11	100 CZ: 1, 8, and/or 11	135 CZ: 1, 8, and 11	90 CZ: 1, 8, and/or 11	
<i>Terrestrial cover and aestivation habitat</i>	470	0	470	470 CZ: 1, 8, and 11	0	7,530 CZ: 1, 8, and 11	0	
California tiger salamander								<p><b>Mitigation:</b> Impacts on California tiger salamander result from BDCP actions that remove modeled tiger salamander habitat. Mitigation for impacts on vernal pool complex habitats that support vernal pools will be achieved by applying USFWS biological opinion mitigation guidelines recommending preservation of 3 acres of existing habitat and restoration of 2 acres of vernal pool habitat. Preserved and restored habitats will be located within or adjacent to occupied tiger salamander habitats. Existing unprotected vernal pool complex terrain will be preserved and managed in conjunction with BDCP preserved grassland habitats in Conservation Zones 1, 8, and/or 11. Restored vernal pool complex terrain Restored vernal pool complex terrain will be designed to provide high breeding habitat function for tiger salamander and will be restored in these same Conservation Zones on lands that historically supported fully functioning vernal pool habitats. Habitat will be preserved and restored in the largest possible patch sizes and management of preserved and restored vernal pool complex terrain (e.g., livestock grazing) will be designed to enhance habitat functions for tiger salamander and other associated covered vernal pool-associated species.</p> <p>Mitigation for impacts on terrestrial habitat will be provided by preservation of grassland habitat that is within or connected to occupied tiger salamander habitat. Terrestrial habitat affected by conveyance construction in the east Delta (188 acres) is not believed to be occupied by the species; consequently mitigation habitat will be preserved in or near known occupied habitats in Conservation Zones 1, 8, and/or 11 to ensure maximum benefit to the species. Mitigation habitat will be preserved and managed in conjunction with preservation of conserved salamander vernal pool complex and grassland habitats. The preserved habitat will be managed to increase the abundance of squirrel burrows to increase the availability of aestivation sites.</p> <p><b>Conservation Provided:</b> Vernal pool complex terrain supporting tiger salamander vernal pool breeding habitat is present in Conservation Zones 1, 2, 4, 8, 9, and 11 along the upper elevation margins of the Delta. Opportunities for large scale conservation of tiger salamander breeding habitat within the Planning Area, however, are located only in Conservation Zones 1, 8, and 11. Vernal pool complex terrain in Conservation Zones 2 and 4 is almost entirely under protected status (99 percent) and vernal pool complex terrain in Conservation Zone 9 (approximately 120 acres) is located in the vicinity of Discovery Bay and is largely fragmented by development and cultivated lands. Habitat will be preserved in the largest possible patch sizes, will be located such that it is within or connected to occupied tiger salamander habitat, and will be contiguous with preserved mitigation habitat. Conservation of breeding habitat will be provided through preservation of 135 acres and restoration of 90 acres of vernal pool terrain that supports vernal pool shrimp habitat. Conserved habitat will be designed and managed as described for mitigation habitat. At least 50 acres of habitat (for mitigation or conservation) will be preserved in Conservation Zone 8 and 50 acres in Conservation Zone 11. Management of preserved vernal pool complex terrain (e.g., livestock grazing) will be designed to enhance tiger salamander breeding habitat functions. Habitat will</p>

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
								<p>preserved in conjunction with preserved grassland and alkali seasonal wetlands that will also be preserved in these conservation zones.</p> <p>Upland terrestrial cover and aestivation habitat will be preserved in Conservation Zones 1, 8, and 11. Upland habitat will be comprised of grassland that encompasses preserved aquatic breeding habitats and that is within or connected to occupied tiger salamander habitat. Connections to occupied habitat will be of sufficient width to provide for the movement of salamanders to and from occupied habitat areas. Preserved grassland habitats will be managed to provide appropriate vegetative conditions to facilitate salamander movement and reduce predation exposure and to maintain or increase the abundance of ground squirrels and other fossorial species to improve the availability of suitable aestivation sites. The proposed preservation, restoration, and preservation of tiger salamander breeding and upland habitats within or connected to occupied habitats is expected to sustain tiger salamander populations within the Planning Area and provide for the increase in abundance and distribution of salamanders within and near the Planning Area. Following completion of conservation actions, approximately 69 percent of tiger salamander vernal pool complex breeding habitat and 74 percent of its upland habitat will be protected.</p>
<i>Aquatic breeding habitat</i>	50	0	50	150 CZ: 1, 8, and 11	100	135 CZ: 1, 8, and 11	90 CZ: 1, 8, and/or 11	
<i>Terrestrial cover and aestivation habitat</i>	470	0	470	470 CZ: 1, 8, and 11	0	7,530 CZ: 1, 8, and 11	0	
Valley elderberry longhorn beetle								<p><b>Mitigation:</b> As elderberry shrubs are encountered during preconstruction surveys, mitigation for losses of elderberry shrubs will follow standard USFWS guidelines. The guidelines require planting elderberry seedlings and associated riparian species, and possible translocation of elderberry shrubs on a protected mitigation site. There is otherwise no habitat-based mitigation proposed for valley elderberry longhorn beetle. Mitigation requirements will be incorporated into the design of BDCP restored riparian habitat.</p> <p><b>Conservation Provided:</b> Conservation of valley elderberry longhorn beetle will be provided through restoration of 5,000 acres of riparian habitat. Plantings of elderberry shrubs, including shrubs translocated as mitigation, will be incorporated into the design of restored habitat. Habitat will be provided in large patches that will be managed to control the establishment of undesirable non-native vegetation that can affect the health of the beetle's host elderberry plant. Restoration of 5,000 acres of riparian habitat that supports elderberry shrubs will increase the extent of the beetle's riparian vegetation habitat by 29 percent relative to existing conditions and is expected to be sufficient to sustain populations in the Planning Area and provide for increasing the distribution and abundance of the species. Numeric targets for preservation of existing habitat are not established, however, elderberry shrubs that are present within BDCP preserved habitat areas will be protected and maintained.</p>
<i>Riparian vegetation</i>	800	1	800	0	Incorporated into conserved habitat.	0	5,000	

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	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
<i>Non-riparian channels and grasslands</i>	390	1	390	0	Incorporated into conserved habitat.	0	0	
Vernal pool shrimp species ( <i>Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, mid valley fairy shrimp</i> )	50	0	50	150 CZ: 1, 8, and 11	100 CZ: 1, 8, and/or 11	140 CZ: 1, 8, and 11	90 CZ: 1, 8, and/or 11	<p><b>Mitigation:</b> Impacts on vernal pool shrimp species result from BDCP actions that remove modeled vernal pool shrimp species habitat. Mitigation for impacts on vernal pool complex habitats that support vernal pools will be achieved by applying USFWS biological opinion mitigation guidelines recommending preservation of 3 acres of existing habitat and restoration of 2 acres of vernal pool habitat. Existing unprotect vernal pool complex terrain will be preserved and managed in conjunction with BDCP preserved grassland habitats in Conservation Zones 1, 8, and/or 11. Restored vernal pool complex terrain Restored vernal pool complex terrain will be designed to provide high habitat function for vernal pool shrimp species and will be restored in these same Conservation Zones on lands that historically supported fully functioning vernal pool habitats. Habitat will be preserved and restored in the largest possible patch sizes and management of conserved vernal pool complex terrain (e.g., livestock grazing) will be designed to enhance habitat functions for covered shrimp species and associated vernal pool plant species.</p> <p><b>Conservation Provided:</b> Vernal pool complex terrain supporting vernal pool shrimp habitat is present in Conservation Zones 1, 2, 4, 8, 9, and 11 along the upper elevation margins of the Delta. Opportunities for large scale conservation of vernal pool shrimp species within the Planning Area, however, are located only in Conservation Zones 1, 8, and 11. Vernal pool complex terrain in Conservation Zones 2 and 4 is almost entirely under protected status (99 percent) and vernal pool complex terrain in Conservation Zone 9 (approximately 120 acres) is located in the vicinity of Discovery Bay and is largely fragmented by development and cultivated lands. Habitat will be preserved in the largest possible patch sizes and will be contiguous with preserved mitigation habitat. Conservation will be provided through preservation of 135 acres and restoration of 90 acres of vernal pool terrain that supports vernal pool shrimp habitat. Conserved habitat will be designed and managed as described for mitigation habitat. At least 50 acres of habitat (for mitigation or conservation) will be preserved in Conservation Zone 8 and 50 acres in Conservation Zone 11. Habitat will preserved in conjunction with preserved grassland and alkali seasonal wetlands that will also be preserved in these conservation zones. Management of preserved vernal pool complex terrain (e.g., livestock grazing) will be designed to enhance habitat functions for covered shrimp species and associated vernal pool plant species. The proposed preservation and restoration of vernal pool complex terrain, in conjunction with existing protected habitat, is expected to sustain shrimp populations within the Planning Area and increase the distribution and abundance of covered vernal pool shrimp species. Following completion of conservation actions, approximately 69 percent of vernal pool shrimp species vernal pool complex habitat will be protected.</p>
Vernal pool plant species ( <i>Alkali milk-vetch, San Joaquin spearscale Boggs Lake hedge-hyssop, Heckard's peppergrass, and legenere</i> )	100	0	100	300 CZ: 1, 8, and 11	200 CZ: 1, 8, and/or 11	Protect at least 40 percent of known occurrences of each species	0	<p><b>Mitigation:</b> Impacts on vernal pool plant species result from BDCP actions that remove modeled vernal pool plant species habitat. Mitigation for impacts on vernal pool complex habitats that support vernal pools will be achieved by applying USFWS biological opinion mitigation guidelines recommending preservation of 3 acres of existing habitat and restoration of 2 acres of vernal pool habitat. Existing unprotect vernal pool complex terrain will be preserved and managed in conjunction with BDCP preserved grassland habitats in Conservation Zones 1, 8, and/or 11. Restored vernal pool complex terrain Restored vernal pool complex terrain will be designed to provide high habitat function for vernal pool plant species and will be restored in these same Conservation Zones on lands that historically supported fully functioning vernal pool habitats. Habitat will be preserved and restored in the largest possible patch sizes and management of conserved vernal pool complex terrain (e.g., livestock grazing, non-native plant species control) will be designed to enhance habitat functions for covered vernal pool plant species and associated vernal pool shrimp species.</p>

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
								<b>Conservation Provided:</b> Conservation of vernal pool plant species will be directed at preserving known occurrences of each species and managing preserved vernal pool complex and alkali seasonal wetland complex to improve habitat conditions for these species. Consistent with the Solano County HCP draft objectives for these species, sufficient occurrences will be brought under protection within the Planning Area and Suisun Marsh such that at least 40 percent of the known occurrences of each species are protected. Occurrences may be protected through preservation of mitigation vernal pool complex terrain or preservation of additional lands. To achieve this target, protection of occurrences of each of the species may also be protected outside of the Planning Area and Suisun Marsh consistent with conservation plans for those locations. Protecting and enhancing vernal pool plant species habitat that supports occurrences is expected to help maintain and potentially increase these species distributions and abundances.
Heartscale and brittlescale	10	0	10	50 CZ: 1, 8, and/or 11	0	100 CZ: 1, 8, and/or 11		<b>Mitigation:</b> Impacts on heartscale and brittlescale result from BDCP actions to restore tidal habitats that remove modeled heartscale and brittlescale habitat. No guidelines are established for mitigating impacts on these species habitats. To mitigate effects on these species, 5 acres of heartscale and brittlescale habitat will be preserved for every acre of affected modeled habitat. Preserved habitat will be incorporated within larger patches of preserved grassland and vernal pool complex habitats that will complement their wetland habitat functions and will be managed to improve habitat conditions for these species (e.g., grazing management practices, control of non-native plant species). Priority will be given to preserving habitat areas that support species occurrences. <b>Conservation Provided:</b> Conservation of heartscale and brittlescale will be directed at preserving currently unprotected drainages that support the known elements (e.g., soils, hydrology) of their habitat. Priority will be given to preserving habitat that support species occurrences or are within the watersheds that support known occurrences. Preserved habitat will be managed in conjunction with other preserve lands as described for preserved mitigation habitats. Protecting and enhancing heartscale and brittlescale habitat that supports heartscale and brittlescale is expected to help maintain and potentially increase these species distributions and abundances.
Slough thistle	0	0	0	0	0	0	≥1,000 CZ: 7	<b>Mitigation:</b> BDCP actions are not expected to affect slough thistle habitat or individuals, therefore, no mitigation is required. <b>Conservation Provided:</b> Conservation of slough thistle will be directed towards restoring its floodplain wetland habitat along the San Joaquin River. At least 1,000 acres of floodplain habitat will be restored that will be designed and managed to support patches of suitable habitat (e.g., soils, flood disturbance regime). If appropriate, this species may be translocated to establish new occurrences within restored habitat. Reestablishing patterns of flood flows to floodplain historically occupied by this species is expected to allow for increases in the species distribution and abundance.
Suisun thistle and soft bird's-beak	120	0	120	0	360 CZ: 11	0	3,310-4,460 CZ: 11	<b>Mitigation:</b> Impacts on Suisun thistle and soft bird's-beak result from BDCP actions to restore tidal habitats. Physical removal or disturbance to individual plants will be avoided. Impacts on modeled habitat and any plants present in impacted habitat could result from changes in hydrologic and/water quality conditions (e.g., dessication, inundation, and change in local salinity gradients) that result from changes in tidal range associated with restoring tidal habitat. To the extent possible, tidal habitat restoration projects will be designed to avoid these types of indirect effects on known occurrences. Impacts on modeled habitat will be mitigated by restoring 3 acres of tidal marsh habitat for every acre of affected modeled habitat. Restored habitats will be established in large patches that will be designed to capture the full range of gradients that were associated with historical Delta and Suisun Marsh tidal habitats to ensure that habitat conditions suitable for these species are established. Restored habitats will also be managed to minimize known species stressors, including livestock grazing practices and establishment of non-

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
								<p>native plant species.</p> <p><b>Conservation Provided:</b> Conservation of Suisun thistle and soft bird's-beak will be directed at restoring large tracts of its historical Suisun Marsh habitats such that the range of ecological gradients that support species habitat over time are provided. Restoration of tidal marsh in Suisun Marsh is consistent with and helps achieve the Suisun thistle and soft bird's-beak objectives of the draft tidal marsh ecosystems recovery plan (USFWS 2010). Conserved habitat will be managed in conjunction with and as described for restored mitigation habitats. Restoration will increase the extent of tidal marsh plain that support patches of suitable habitat for these species by over 500 percent and, as such, is expected to provide for the future expansion of these species abundance and distribution.</p>
Delta button celery	30	0	30	50 CZ: 8	0	≥1,300 CZ: 7		<p><b>Mitigation:</b> Impacts on delta button celery result only from construction of conveyance facilities. No guidelines are established for mitigating impacts on these species habitats. Mitigation will be provided through preservation of 2 acres of modeled habitat for every acre of affected modeled habitat in Conservation Zone 8 where impacts will occur. Preserved habitat will be incorporated within larger patches of preserved grassland, vernal pool complex, and alkali seasonal wetland habitats that will complement their wetland habitat functions and will be managed to improve habitat conditions for this species (e.g., grazing management practices, control of non-native plant species). Priority will be given to preserving habitat areas that support species occurrences.</p> <p><b>Conservation Provided:</b> Conservation of delta button celery will be directed at preserving currently unprotected alkali habitats that support the known elements (e.g., soils, hydrology) of its habitat and restoring floodplain habitat along the San Joaquin River. At least 300 acres of existing unprotected habitat will be preserved in Conservation Zone 8 that will be designed and managed as described for preserved mitigation habitats. Priority will be given to preserving habitat that support occurrences or are connected to occupied habitats. At least 1,000 acres of floodplain habitat will be restored that will be designed and managed to support patches of suitable habitat (e.g., soils, flood disturbance regime). If appropriate, this species may be translocated to establish new occurrences within restored habitat. Preserving remaining occupied habitat areas and reestablishing patterns of flood flows to floodplain historically occupied by this species is expected to sustain the species within the Planning Area and provide for increases in the species distribution and abundance.</p>
Carquinez goldenbush	40	0	40	130 CZ: 1 and/or 11	0	170 CZ: 1 and/or 11		<p><b>Mitigation:</b> Impacts on Carquinez goldenbush result only from BDCP actions to restore tidal habitats. Physical removal or disturbance to individual plants will be avoided to the extent possible. No guidelines are established for mitigating impacts on these species habitats. Impacts on modeled habitat will be mitigated by preserving 3 acres of modeled habitat or each acre of existing modeled habitat. Priority will be given to preservation of occupied habitat or unoccupied habitat that are connected to occupied habitats. Preserved habitat will be incorporated within larger patches of preserved grassland and vernal pool complex habitats that will complement their wetland habitat functions and will be managed to improve habitat conditions for these species (e.g., grazing management practices, control of non-native plant species).</p> <p><b>Conservation Provided:</b> Conservation of Carquinez goldenbush will be directed at preserving currently unprotected alkali seasonal wetlands that support the known elements (e.g., soils, hydrology) of its habitat. Priority will be given to preserving habitat that support occurrences or are connected to occupied habitats. If desirable and consistent with adjacent conservation plans, unprotected occupied habitat may be protected adjacent to the Planning Area and Suisun Marsh. Preserved habitat will be managed in conjunction with other preserve lands as described for preserved mitigation habitats. Carquinez goldenbush is found only in a very limited geographical range and the population sizes of each occurrence are very small. It is not known why the abundance and distribution of Carquinez goldenbush is so limited. The preservation of Carquinez goldenbush habitat is expected to help maintain</p>

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
								and provide the basis for potentially increasing the distribution and abundance Carquinez goldenbush in the Plan and Suisun Marsh areas. Following implementation of BDCP actions, approximately 70 percent of the species modeled will be protected in the Planning Area and Suisun Marsh.
Delta tule pea and Suisun Marsh aster	550	0	550	0	550 CZ: 1, 4, 7, and 11	0	16,420-25,920 CZ: 1, 4, 7, and 11	<p><b>Mitigation:</b> Impacts on delta tule pea and Suisun Marsh aster result primarily from BDCP actions to restore tidal habitats. Physical removal or disturbance to individual plants will be avoided to the extent possible. Impacts on modeled habitat and any plants present in impacted habitat could result from changes in hydrologic and/water quality conditions (e.g., dessication, inundation, and change in local salinity gradients) that result from changes in tidal range associated with restoring tidal habitat. To the extent possible, tidal habitat restoration projects will be designed to avoid these types of indirect effects on known occurrences. Impacts on modeled habitat will be mitigated by restoring 1 acre of tidal marsh habitat for every acre of affected modeled habitat. Restored habitats will be established in large patches that will be designed to capture the full range of gradients that were associated with historical Delta and Suisun Marsh tidal habitats to ensure that habitat conditions suitable for these species are established. Restored habitats will also be managed to minimize known species stressors, including establishment of non-native plant species and use of herbicides.</p> <p><b>Conservation Provided:</b> Conservation of delta tule pea and Suisun Marsh aster will be directed at restoring large tracts of their historical Delta and Suisun Marsh habitats such that the range of ecological gradients that support species habitat over time are provided. Restoration of tidal marsh in Suisun Marsh is consistent with and helps achieve the delta tule pea objectives of the draft tidal marsh ecosystems recovery plan (USFWS 2010). Conserved habitat will be managed in conjunction with and as described for restored mitigation habitats. Restoration will increase the extent of tidal marsh plain that support patches of suitable habitat for these species by over 500 percent and, as such, is expected to provide for the future expansion of these species abundance and distribution. These species also inhabit the intertidal zone of Delta channel margins. Consequently, these species are also expected to benefit from restoration of channel margin and floodplain habitats that enhance or restore their intertidal channel margin habitats.</p>
Mason's lilaepsis and delta mudwort	80	0	80	0	80 CZ: 1, 4, 7, and 11)	0	16,900-26,480 CZ: 1, 4, 7, and 11)	<p><b>Mitigation:</b> Impacts on delta tule pea and Suisun Marsh aster result from BDCP actions to restore tidal habitats. Physical removal or disturbance to individual plants will be avoided to the extent possible. Impacts on modeled habitat and any plants present in impacted habitat could result from changes in hydrologic and/water quality conditions (e.g., dessication, inundation, and change in local salinity gradients) that result from changes in tidal range associated with restoring tidal habitat. To the extent possible, tidal habitat restoration projects will be designed to avoid these types of indirect effects on known occurrences. Impacts on modeled habitat will be mitigated by restoring 1 acre of tidal marsh habitat for every acre of affected modeled habitat. Restored habitats will be established in large patches that will be designed to capture the full range of gradients that were associated with historical Suisun Marsh tidal habitats to ensure that habitat conditions suitable for these species are established. Restored habitats will also be managed to minimize known species stressors, including establishment of non-native plant species and recreational activities.</p> <p><b>Conservation Provided:</b> Conservation of Mason's lilaepsis and delta mudwort will be directed at restoring large tracts of their historical Delta and Suisun Marsh habitats such that the range of ecological gradients that support species habitat over time are provided. Conserved habitat will be managed in conjunction with and as described for restored mitigation habitats. Restoration will increase the extent of tidal marsh plain that support patches of suitable habitat for these species by over 500 percent and, as such, is expected to provide for the future expansion of these species abundance and distribution. These species also inhabit the intertidal zone of Delta channel margins. Consequently, these species are also expected to benefit from restoration of channel margin and floodplain habitats</p>

Covered species	Habitat Impacts <sup>1</sup> (acres <sup>2</sup> )			Habitat Mitigation by Conservation Zone (CZ) <sup>3</sup>		Conservation Provided by Conservation Zone (CZ)		Rationale
	Permanent	Temporary	Total	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	Preservation/ Enhancement (acres <sup>2</sup> )	Restoration (acres <sup>2</sup> )	
								that enhance or restore their intertidal channel margin habitats.
Caper-fruited trepidocarpum	0	0	0	0	0	≥100 CZ: 7		<p><b>Mitigation:</b> BDCP actions are not expected to affect caper-fruited trepidocarpum habitat or individuals, therefore, no mitigation is required.</p> <p><b>Conservation Provided:</b> Conservation of caper-fruited trepidocarpum will be directed at preserving and enhancing at least 50 percent of its remaining unprotected grassland habitats in Conservation Zone 7. All caper-fruited trepidocarpum occurrences have apparently been extirpated in the Planning Area although the species may be present as a persistent seed bank. Preserved habitat will be contiguous with and managed in conjunction with other preserved habitats in Conservation Zone 7. Preserved habitat will be monitored to determine if plants germinate in future years and any located occurrences will be protected and managed to encourage expansion of the such occurrences. The abundance and distribution of caper-fruited trepidocarpum in California is extremely limited. The reasons for its limited abundance and distribution are not known. The preservation of caper-fruited trepidocarpum habitat is expected to help maintain and provide the basis for potentially increasing the distribution and abundance caper-fruited trepidocarpum in the Planning Area. Preserved habitat</p> <p>Based on the level of BDCP habitat effects, the proposed preservation of caper-fruited trepidocarpum habitat is expected to provide for the conservation of caper-fruited trepidocarpum.</p>

<sup>1</sup>Initial estimate prior to the full BDCP effects analysis.

<sup>2</sup>Values above 10 are rounded to the nearest 10 acres.

<sup>3</sup>Mitigation proposal from SAIC. Actual approach and ratios for mitigation may be revised.