

This chapter describes the environmental setting and study area for terrestrial biological resources; analyzes impacts that could result from construction, operation, and maintenance of the Delta Conveyance Project (project); and provides mitigation measures to reduce the effects of potentially significant impacts. This chapter also analyzes the impacts that could result from implementation of compensatory mitigation required for the project and describes any additional mitigation necessary to reduce those impacts, and analyzes the impacts that could result from other mitigation measures associated with other resource chapters in this Draft EIR.

### 13.0 Summary Comparison of Alternatives

Table 13-0 provides a summary comparison of quantitative impacts on some of the more sensitive terrestrial biological resources in the study area by alternative. These impacts include the permanent, long-term temporary (lasting more than 1 year; see discussion in Section 13.3.1.2, *Evaluation of Construction Activities*), and temporary loss or conversion of natural communities, habitat for special-status plant and wildlife species, and impacts on state- and federally regulated wetlands and other waters (aquatic resources). The table presents the CEQA findings after all mitigation is applied.

Constructing the water conveyance facilities would impact areas of natural communities, occurrences and habitat for special-status plants and wildlife species, and aquatic resources in the study area. The central alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would generally result in greater impacts on terrestrial biological resources relative to the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and the Bethany Reservoir alignment alternative (Alternative 5), which is largely due to the improvements on Bouldin Island and road improvements throughout the central alignment. Alternative 2a would result in the greatest impacts on terrestrial biological resources, which would be primarily due to the construction activities on Bouldin Island and the Southern Complex under Alternative 2a, and Alternative 5 the fewest. Alternative 4b would also have relatively fewer impacts, and for some resources, would have the fewest quantified impacts of all alternatives (e.g., valley/foothill riparian, greater and lesser sandhill cranes) primarily due to having only one intake, smaller reusable tunnel material (RTM) impacts associated with the Twin Cities Complex, and the smallest RTM footprint on Lower Robert's Island. Alternative 5 would have substantially fewer impacts on state- and federally regulated aquatic resources compared to the other alternatives (Table 13-0).

Implementation of the Compensatory Mitigation Plan (CMP) (Appendix 3F, *Compensatory Mitigation Plan for Special-Status Species and Aquatic Resources*) would compensate for the loss of natural communities, habitats for species, and aquatic resources. The CMP together with other mitigation measures and environmental commitments to avoid and minimize effects on terrestrial biological resources would reduce impacts for all alternatives to less than significant.

- 1 This chapter also considers the potential impacts of implementing the CMP, as well as other
- 2 mitigation measures, on terrestrial biological resources and concludes that impacts under all
- 3 alternatives would remain less than significant with mitigation.
- 4 Table ES-2 in the Executive Summary provides a summary of all impacts disclosed in this chapter.

1 **Table 13-0. Comparison of Impacts on Terrestrial Biological Resources by Alternative (acres/CEQA findings after mitigation)**

Chapter 13 – Terrestrial Biological Resources	Alternative								
	1	2a	2b	2c	3	4a	4b	4c	5
Impact BIO-1: Impacts of the Project on the Tidal Perennial Aquatic Natural Community	54.66/ LTS	67.43/ LTS	50.81/ LTS	53.42/ LTS	43.32/ LTS	56.59/ LTS	39.98/ LTS	42.54/ LTS	11.13/ LTS
Impact BIO-2: Impacts of the Project on Tidal Freshwater Emergent Wetlands	1.05/ LTS	0.87/ LTS	0.87/ LTS	0.87/ LTS	0.40/ LTS	0.40/ LTS	0.40/ LTS	0.40/ LTS	0.57/ LTS
Impact BIO-3: Impacts of the Project on Valley/Foothill Riparian Habitat	72.00/ LTS	75.02/ LTS	68.15/ LTS	71.14/ LTS	27.29/ LTS	30.62/ LTS	23.76/ LTS	26.73/ LTS	29.31/ LTS
Impact BIO-4: Impacts of the Project on the Nontidal Perennial Aquatic Natural Community	1.06/ LTS	1.44/ LTS	0.78/ LTS	0.96/ LTS	0.88/ LTS	1.26 LTS	0.60/ LTS	0.78/ LTS	1.68/ LTS
Impact BIO-5: Impacts of the Project on Nontidal Freshwater Perennial Emergent Wetland	9.62/ LTS	9.57/ LTS	9.05/ LTS	9.57/ LTS	0.85/ LTS	0.85/ LTS	0.33/ LTS	0.85/ LTS	0.75/ LTS
Impact BIO-6: Impacts of the Project on Nontidal Brackish Emergent Wetland	0/ NI	0/ NI	0/ NI	0/ NI	0/ NI	0/ NI	0/ NI	0/ NI	0/ NI
Impact BIO-7: Impacts of the Project on Alkaline Seasonal Wetland Complex	4.76/ LTS	4.76/ LTS	4.76/ LTS	4.76/ LTS	4.76/ LTS	4.76/ LTS	4.76/ LTS	4.76/ LTS	0.76/ LTS
Impact BIO-8: Impacts of the Project on Vernal Pool Complex	19.17/ LTS	19.17/ LTS	18.85/ LTS	19.17/ LTS	19.17/ LTS	19.17/ LTS	18.85/ LTS	19.17/ LTS	26.08/ LTS
Impact BIO-12: Impacts of the Project on Tidal Freshwater Emergent Wetland Plants <sup>a</sup>	6.41/ LTS	7.78/ LTS	5.80/ LTS	6.27/ LTS	4.17/ LTS	5.60/ LTS	3.62/ LTS	4.09/ LTS	1.49/ LTS
Impact BIO-14: Impacts of the Project on Vernal Pool Aquatic Invertebrates <sup>b</sup>	79.46/ LTS	82.81/ LTS	79.46/ LTS	79.46/ LTS	79.46/ LTS	82.81/ LTS	79.46/ LTS	79.46/ LTS	12.73/ LTS
Impact BIO-18: Impacts of the Project on Valley Elderberry Longhorn Beetle <sup>c</sup>	72.02/ LTS	75.02/ LTS	68.14/ LTS	71.14/ LTS	27.29/ LTS	30.61/ LTS	23.74/ LTS	26.72/ LTS	29.31/ LTS
Impact BIO-22: Impacts of the Project on California Tiger Salamander	115.26/ LTS	166.29/ LTS	115.26/ LTS	115.26/ LTS	115.26/ LTS	166.29/ LTS	115.26/ LTS	115.26/ LTS	78.65/ LTS
Impact BIO-33: Impacts of the Project on Greater Sandhill Crane and Lesser Sandhill Crane <sup>d</sup>	1,595.93 / LTS	1,805.05 / LTS	1,304.67 / LTS	1,478.58 / LTS	1,200.73 / LTS	1,403.38 / LTS	907.75 / LTS	1,083.31 / LTS	1,427.66 / LTS
Impact BIO-39: Impacts of the Project on Swainson's Hawk	3,105.23 / LTS	3,432.44 / LTS	2,811.70/ LTS	2,985.46 / LTS	2,812.20 / LTS	3,155.33 / LTS	2,484.99 / LTS	2,679.87/ LTS	1,811.00 / LTS

Chapter 13 – Terrestrial Biological Resources	Alternative								
	1	2a	2b	2c	3	4a	4b	4c	5
Impact BIO-51: Substantial Adverse Effect on State- or Federally Protected Wetlands and Other Waters through Direct Removal, Filling, Hydrological Interruption, or Other Means	226.33/ LTS	241.07/ LTS	217.03/ LTS	223.69/ LTS	168.86/ LTS	185.91/ LTS	159.50/ LTS	166.31/ LTS	60.98/ LTS

- 1 CEQA findings after mitigation is applied: NI = no impact; LTS = less than significant.
- 2 <sup>a</sup> Impact acres presented are for Mason’s lilaeopsis modeled habitat.
- 3 <sup>b</sup> Project impact acres include permanent, long-term temporary, temporary, and indirect impacts for vernal pool aquatic invertebrates.
- 4 <sup>c</sup> Impact acres presented are for the riparian portion of the species model. The “other potential habitat” portion of the model was used to identify where additional shrubs may occur and not to quantify actual impacts on habitat.
- 5
- 6 <sup>d</sup> Impact acres presented are for greater sandhill crane modeled habitat.

## 13.1 Environmental Setting

This section describes the environmental setting for the terrestrial biological resources present in the study area. The section presents the natural communities and other land cover types, the special-status terrestrial wildlife and plants, and the terrestrial invasive plants found in the study area. A brief discussion of the historical modifications of ecosystem processes and functions in the study area is also included because it is crucial to understanding the current status of natural communities and terrestrial plants and wildlife addressed in the study area. Special-status plant and wildlife species considered for inclusion in the chapter, as well as their status, range, and potential to occur in the study area, are presented in Appendix 13A, *Special-Status Species with Potential to Occur in the Study Area*.

### 13.1.1 Study Area

The study area, defined as the area in which impacts may occur, primarily comprises the statutory Delta, as delineated under the Delta Protection Act (Wat. Code § 12220) as well as a few areas east of this boundary, to capture project infrastructure and areas to the southwest of the legal Delta to include the area around Bethany Reservoir for Alternative 5 (Mapbooks 13-1, 13-2, and 13-3).

Historical modifications of ecosystem processes and functions in the study area have had a great influence on the current conditions of natural communities and special-status species. A brief overview of major historical trends in terrestrial biodiversity is provided below.

Prior to the effects of hydraulic mining, flood control, and agricultural and urban development, the Delta was a large tidal marsh fed by California's two largest rivers, the Sacramento and the San Joaquin (Delta Stewardship Council 2013:2,3). The passage of the federal Swamp Land Act of 1850 and similar California legislation in 1861 led to the conversion of seasonally and tidally flooded lands into croplands protected by levees and the formation of channels to move water out of the Delta (Delta Stewardship Council 2013:8). Further land use changes and urbanization have led to the loss of 95% to 97% of the historical tidal marsh wetlands in the Delta (Whipple et al. 2012:93, Delta Stewardship Council 2013:8).

The abundance of native wildlife and plant species has been reduced over time as a result of the extensive historical modifications to and loss of the habitats in the study area. For example, large mammal species, such as tule elk (*Cervus canadensis nannodes*), have been reduced in numbers across the state and in the region and are limited to a reintroduced population of 300 elk on Grizzly Island, west of the study area (California Department of Fish and Wildlife 2018a:245). Small mammal species, such as riparian brush rabbit (*Sylvilagus bachmani riparius*), now occur only in scattered locations in the study area (California Department of Fish and Wildlife 2020a). Habitat for several rare, threatened, or endangered species, such as the California black rail (*Laterallus jamaicensis coturniculus*) and Mason's lilaeopsis (*Lilaeopsis masonii*), are now limited to remnant marshes in the study area. Habitat modification has also led to conditions that favored invasive species and reduced native species diversity (San Francisco Estuary Institute 2014:22).

Although fragmented, limited riparian habitat remains in the study area. Remnant patches of tall riparian trees, such as Fremont cottonwood (*Populus fremontii*), western sycamore (*Platanus racemosa*), and Goodding's black willow (*Salix gooddingii*), persist, but the recruitment of these

1 species is greatly impaired by lack of active floodplain habitat and hydrologic modifications (e.g.,  
2 straightened and dredged channels, dams, water diversions, sedimentation from hydraulic mining,  
3 levees separating riparian vegetation from channel). The number of species of nesting birds and  
4 mammals that depend on riparian habitat and that may be found in the study area has declined  
5 during the last 150 years (Bay Institute 1998:3-1). The western yellow-billed cuckoo (*Coccyzus*  
6 *americanus*), the least Bell's vireo (*Vireo bellii*), which are both listed by California Department of  
7 Fish and Wildlife (CDFW) as endangered and by U.S. Fish and Wildlife Service (USFWS) as  
8 threatened and endangered, respectively, and the yellow warbler (*Setophaga petechia*), a California  
9 species of special concern, formerly nested throughout the Central Valley (Grinnell and Miller  
10 1944:186–187; Grinnell and Miller 1944:398–400; 51 *Federal Register* [FR] 16474). Now these  
11 species are considered locally extirpated as breeders in the study area (U.S. Fish and Wildlife Service  
12 2006:7; Heath 2008:334; San Francisco Estuary Institute 2014:63), and occurrences within the  
13 study area are presumed to be migrating birds. Reports from early explorers describe the Delta and  
14 adjacent lands as an area with much greater wildlife species diversity than is currently found (Bay  
15 Institute 1998:2-70).

16 Grasslands with vernal pools, also known as vernal pool complexes, support high levels of endemic  
17 biodiversity in the Central Valley (Solomeshch et al. 2007:394–424). This habitat type generally  
18 occurs in the northeast, northwest, and southwest areas of the study area. The vernal pool landscape  
19 in the northeast and northwest portion of the study area has been affected to some degree by  
20 leveling for agricultural land uses (e.g., Stone Lakes National Wildlife Refuge). The grasslands that  
21 support vernal pools, including alkali seasonal wetlands, in the southwest study area has been  
22 fragmented by agricultural and residential development and by water management projects. Only  
23 limited habitat remains for vernal pool species, such as fairy shrimp and native plants. It is  
24 estimated that throughout the Central Valley, the acreage of grasslands with vernal pools has  
25 declined from 7 million acres during the 1700s to about 895,000 acres in 2005 (Holland 2009:1).  
26 Approximately 135,000 acres were estimated to have been lost from 1976 to 2005 (Holland  
27 2009:3).

28 Most of the land in the study area has been converted to agricultural land uses, which provide  
29 limited habitat value to most species. Some species, however, including Swainson's hawk (*Buteo*  
30 *swainsoni*) and greater sandhill crane (*Grus canadensis tabida*), use the alfalfa and field crop areas  
31 for foraging. Besides changing land use, agricultural practices can include (1) building levees, which  
32 modify hydrology, (2) applying pesticides and fertilizers, which alters surface and groundwater  
33 quality (see Chapter 5, *Surface Water*, and Chapter 8, *Groundwater*) and may be toxic to certain  
34 species, reducing cover and prey availability (e.g., insects, rodents), and (3) other activities that can  
35 be detrimental to native plant and wildlife habitat.

## 36 13.1.2 Land Cover Types

37 In July 2020 land cover mapping data were compiled from multiple sources into a geographic  
38 information system (GIS) dataset that was used to (1) depict the land cover that occurs in the study  
39 area and (2) develop habitat models for special-status species that are known to or have a potential  
40 to occur in the study area. Land cover data consist of three general categories: natural communities,  
41 agricultural lands, and developed areas.

42 Natural communities are distinct and recurring assemblages of plants and animals associated with  
43 specific physical environmental conditions and ecological processes. A natural community occurs  
44 across a landscape where similar ecological conditions exist. The Wildlife and Natural Areas

1 Conservation Act defines a natural community as “a distinct, identifiable, and recurring association  
2 of plants and animals that are ecologically interrelated” (California Fish and Game Code [Fish & G.  
3 Code § 2702(d)).

4 Agricultural lands mapped in the study area consist primarily of croplands but also include some  
5 areas of ruderal or managed vegetation that are not crops.

6 Areas mapped as developed in the study area consist of areas of rural and urban residential,  
7 commercial, and industrial development as well as paved and unpaved roads and highways.

### 8 **13.1.2.1 Land Cover Mapping Methods**

9 Land cover data sources were selected that could provide the following:

- 10 • Natural community data at a fine enough scale for developing species habitat suitability models,  
11 especially for species with very specific habitat requirements.
- 12 • Agricultural data that identified individual fields by crop type, which would be used for wildlife  
13 species modeling.
- 14 • Land use data to capture all other developed and managed areas.

### 15 **Natural Communities**

16 The natural community types described in Section 13.1.2.2, *Natural Community Descriptions*, are  
17 based on the general habitat types developed for the CALFED Bay-Delta Program (2000) Ecosystem  
18 Restoration Program Volume 1 and the Multi-Species Conservation Strategy. The natural community  
19 types employed in this Draft EIR were aggregated from the more specific vegetation types obtained  
20 from two data sources: the Delta Vegetation and Land Use Update 2016 (Chico State Research  
21 Foundation Geographical Information Center 2019) and Great Valley Ecoregion Vegetation (Chico  
22 State Research Foundation Geographical Information Center 2018). The Delta vegetation dataset  
23 covers the majority of the study area. The Great Valley dataset covers the few small areas of the  
24 project that are east of the statutory Delta. The Delta vegetation is mapped to the alliance level  
25 following *A Manual of California Vegetation* (Sawyer et al. 2009) when possible, otherwise it is left at  
26 the group level (based on the National Vegetation Classification Standard). The Great Valley dataset  
27 also mapped vegetation using the alliances and group levels defined in *A Manual of California*  
28 *Vegetation* (Sawyer et al. 2009). The land cover for the portion of the study area associated with the  
29 Bethany Reservoir alternative (Alternative 5) to the west of the statutory Delta was developed from  
30 a combination of existing ICF land cover data areas digitized in GIS utilizing the same natural  
31 community naming conventions (ICF 2017; ICF 2018) but not to the alliance or group levels in  
32 Sawyer et al. 2009.

33 The vegetation alliances and group levels (vegetation communities) in these datasets that occur  
34 within the study area were aggregated by natural community type based on their ecological  
35 associations with these natural communities. When a vegetation map polygon could fit into multiple  
36 natural community types, it was assigned to the most appropriate category using either geographic  
37 boundaries or manually by a botanist and a GIS specialist who reviewed the locations of the  
38 vegetation data relative to adjoining communities. For example, the alliance *Lepidium latifolium* can  
39 occur in tidal brackish emergent wetland, tidal freshwater emergent wetland, valley/foothill  
40 riparian, and nontidal freshwater perennial emergent wetland; however, if review of a *Lepidium*

1 *latifolium* alliance polygon found that it was located adjacent to freshwater marsh on the water side  
2 of a levee, it was assigned to tidal freshwater emergent wetland.

3 The following geographic boundaries were used to further differentiate where vegetation  
4 communities would be assigned.

- 5 • For tidal vegetation communities that occur in both brackish and freshwater emergent  
6 wetlands, a geographic boundary was created that spans Suisun Bay from the area near  
7 Collinsville in Solano County to New York Point in Contra Costa County. Vegetation communities  
8 west of this break are considered brackish, and all those to the east are considered freshwater.
- 9 • For vegetation communities that occur in both tidal and nontidal areas, a GIS layer of Delta  
10 levees (California Department of Water Resources 2019) was used to differentiate these  
11 communities. Wetlands on the water side of the levee were defined as tidal, whereas wetlands  
12 on the landward side of the levee were defined as nontidal.

### 13 **Vernal Pool Complex**

14 To identify vernal pool complexes in the study area, a GIS layer of mapped vernal pool complexes  
15 covering the entire study area was used (Witham et al. 2014). This dataset was developed based on  
16 aerial imagery collected in 2012. ICF staff reviewed this data relative to the CDFW vegetation  
17 community data from 2016 to ensure that all areas mapped as vernal pool complexes contained  
18 vegetation data consistent with being part of a vernal pool complex. This action was conducted in  
19 part because the Delta vegetation dataset was more recent (based on aerial imagery from 2016).  
20 Also, the Witham et al. (2014) mapping was conducted without minimum mapping units, whereas  
21 the polygons for the Delta vegetation dataset had a minimum mapping unit of 0.25 acre (Chico State  
22 Research Foundation Geographical Information Center 2019) and the Great Valley dataset had a  
23 minimum mapping unit of 1.0 acre (Chico State Research Foundation, Geographical Information  
24 Center 2018). When falling within an area mapped as vernal pool complex, the following vegetation  
25 polygons were assigned to the vernal pool complex natural community, rather than the grassland  
26 natural community.

- 27 • California mixed annual/perennial freshwater vernal pool/swale bottomland
- 28 • California annual herb/grass group
- 29 • Mediterranean California naturalized annual and perennial grassland.

30 Because the area around Clifton Court Forebay contains a mosaic of vernal pools, alkaline seasonal  
31 wetlands, and grasslands that provide habitat for vernal pool species, the following alliance types  
32 were also included within the vernal pool complex natural community if they fell within one of the  
33 Witham et al. (2014) vernal pool complexes.

- 34 • *Allenrolfea occidentalis*
- 35 • *Distichlis spicata*
- 36 • *Frankenia salina*
- 37 • *Suaeda moquinii*
- 38 • Western North American disturbed alkaline marsh and meadow

39 During the review of a draft of this data layer, some areas mapped as California mixed  
40 annual/perennial freshwater vernal pool/swale bottomland were found occurring outside of the



1 vernal pool complex polygons mapped by Witham et al. (2014). A review of aerial photographs  
2 indicated these areas appeared to support vernal pools and were therefore assigned to the vernal  
3 pool complex natural community. These vegetation polygons were incorporated with the Witham et  
4 al. (2014) data to produce a new vernal pool complex layer for use in the analysis.

#### 5 **Aquatic Resources Delineation Data**

6 California Department of Water Resources (DWR) conducted an aquatic resources delineation for  
7 the project within a portion of the project study area that contained all potential alternative  
8 alignments and associated infrastructure (delineation study area) (California Department of Water  
9 Resources and GEI Consultants Inc. 2020). DWR submitted the delineation to the U.S. Army Corps of  
10 Engineers (USACE) using the Preliminary Jurisdictional Determination process, which is a USACE  
11 determination that does not address questions of jurisdiction, thereby treating all aquatic resources  
12 within the review area that could be jurisdictional as if they are jurisdictional for purposes of permit  
13 processing (33 Code of Federal Regulations [CFR] § 331.2) (California Department of Water  
14 Resources and GEI Consultants Inc. 2020:iii). The initial delineation was verified by USACE on June  
15 18, 2020; however, because of expansions of the project to the east and west, additional areas were  
16 delineated in late 2020 (California Department of Water Resources 2020a) and in 2021 (California  
17 Department of Water Resources 2021). The initial delineation was also submitted to the State Water  
18 Resources Control Board (State Water Board) for their review and concurrence. Following their  
19 review, the State Water Board concurred that the aquatic resources mapped by DWR would be  
20 considered to include all waters of the State. The delineation study area used for CEQA analysis is  
21 143,485 acres and represents approximately 19% of the project study area. For the purposes of the  
22 land cover mapping in the study area, the aquatic resources data replaced all other land cover  
23 datasets with which it intersected. This resulted in a conflict between some natural communities  
24 mapped in the Delta Vegetation and Land Use Update 2016 and wetlands mapped by DWR. The  
25 differences are largely due to differences in mapping methods (e.g., underlying aerial datasets used)  
26 and minimum mapping units, which result in disagreement on the extent of specific polygons. This  
27 resulted in small areas that CDFW originally mapped as a wetland land cover type that DWR  
28 considered to be non-wetland and other areas that DWR considered to be a wetland but that CDFW  
29 did not map as a wetland type. The majority of these small areas consist of slivers of upland,  
30 developed, or agricultural areas. These differences account for a total of 1,592 acres in the  
31 delineation study area, or approximately 1.2% of the mapped land cover in the delineation study  
32 area. Due to the relatively small amount of area, considering the scale of the analysis, and that acres  
33 of natural community and species habitat affected would be verified once access is obtained for all  
34 work areas, these slivers in the GIS dataset were not corrected for the analysis and it is assumed that  
35 the GIS land cover dataset is sufficient for estimating effects on terrestrial biological resources.  
36 Outside of the delineation study area, data from the vegetation datasets described above (Chico  
37 State Research Foundation, Geographical Information Center 2018, 2019; ICF 2017, 2018) were  
38 used to identify areas of wetlands and waters. More detail on the aquatic resources delineation is  
39 presented in Section 13.1.4, *Wetlands and Other Waters of the United States*.

#### 40 **Seasonal Wetlands**

41 DWR's aquatic resources delineation identified 2,319 acres (Table 13-1) of seasonal wetlands in the  
42 delineation study area (California Department of Water Resources and GEI Consultants Inc. 2020;  
43 California Department of Water Resources 2020a, 2021). These seasonal wetlands were defined as  
44 wetlands having seasonal wetland hydrology and dominated by herbaceous wetland plants that are  
45 not vernal pool endemics. Aerial imagery of the seasonal wetlands was reviewed to further define

1 the habitat type based on evidence of past and recent disturbance and on the presence or absence of  
2 vegetation. Seasonal wetlands that appeared to be in crops or recently fallowed were treated as  
3 farmed wetlands and assigned to the Agricultural land cover type. Seasonal wetlands that appeared  
4 to be vegetated by natural vegetation that had not been disturbed for several years or longer were  
5 assigned to the “Other Seasonal Wetland” natural community type.

## 6 **Agricultural Areas**

7 The primary source of agricultural data for the study area comes from the 2018 crop mapping  
8 conducted by Land IQ (Land IQ and California Department of Water Resources 2021). This data  
9 consists of individual fields mapped to crop type using high-resolution (2-meter pixel) satellite  
10 imagery. This dataset does not map non-crop agricultural land cover data, such as farm roads,  
11 outbuildings (e.g., barns, sheds), feedlots, and dairies, which are captured under the “developed”  
12 land cover type. These gaps in agricultural areas were filled in using 2017 land use data produced by  
13 Land IQ for DWR (Land IQ 2019), data from DWR’s *Draft San Joaquin County Land Use Survey 2017*  
14 (California Department of Water Resources 2020b) and the *Sacramento County Land Use Survey*  
15 *2015* (California Department of Water Resources 2016). In addition, the agricultural data includes  
16 areas adjacent to crops that are vegetated by ruderal vegetation or that are heavily managed and do  
17 not fall into a natural vegetation community type. Data to fill this gap was produced using a  
18 combination of satellite and aerial imagery resources together with information collected on the  
19 ground.

20 Also included under the agricultural land cover type are agricultural ditches, which were mapped in  
21 DWR’s aquatic resources delineation.

22 Crop data within the project alternative footprints was reviewed to determine whether there have  
23 been any recent conversions of annual crops to more permanent crops (i.e., orchards and  
24 vineyards), because permanent crops typically provide minimal habitat value for special-status  
25 wildlife species. These areas were reviewed using high-resolution imagery taken in 2018–2019  
26 (Maxar 2020) and reassigned to a more appropriate cover type, when conversions were identified.

## 27 **Other Land Uses**

### 28 **Developed**

29 The only other land use type included in the final land cover map is “developed.” As mentioned  
30 above, the developed land cover includes areas mapped as “semi-agricultural/ROW,” which includes  
31 farm roads, outbuildings (e.g., barns, sheds), feedlots, and dairies. This mapping comes from the  
32 2017 land use data produced by Land IQ for DWR (Land IQ 2019). “Developed” also includes urban  
33 land cover that comes from three datasets: Chico State Research Foundation, Geographical  
34 Information Center 2019, Chico State Research Foundation Geographical Information Center 2018,  
35 and Land IQ 2019. Additional urban areas were identified by reviewing aerial imagery for more  
36 recent urbanization using the 2018–2019 high-resolution imagery (Maxar 2020).

## 37 **13.1.2.2 Natural Community Descriptions**

38 The natural communities are described below, including how each is used by common and special-  
39 status plant and wildlife species. The acreages of each natural community within the study area are  
40 presented in Table 13-1. The distribution of each natural community in the study area is shown in  
41 Mapbooks 13-1, 13-2, and 13-3.

1 **Table 13-1. Area (in acres) of Natural Community Types in the Study Area**

Natural Community Type	Study Area Total	Percentage of the Study Area
Tidal perennial aquatic	61,722	8.3%
Tidal brackish emergent wetland	736	0.1%
Tidal freshwater emergent wetland	9,604	1.3%
Valley/foothill riparian	20,458	2.7%
Nontidal perennial aquatic	8,226	1.1%
Nontidal brackish emergent wetland	3,151	0.4%
Nontidal freshwater perennial emergent wetland	27,266	3.7%
Alkaline seasonal wetland complex	468	0.1%
Vernal pool complex	14,439	1.9%
Other seasonal wetland	2,319	0.3%
Grassland	38,295	5.1%
Agricultural	432,119	58.1%
Developed	125,431	16.9%
Total	744,236	100%

2

3 **Tidal Perennial Aquatic**

4 The tidal perennial aquatic natural community is defined as deep-water aquatic (greater than 10  
5 feet deep from mean lower low tide [i.e., 19-year average of the lowest of the two low tides during  
6 the daily tidal cycle]) and shallow aquatic (less than or equal to 10 feet deep from mean lower low  
7 tide) zones of estuarine bays, river channels, and sloughs. Under present operations, tidal perennial  
8 aquatic in the Delta is mainly freshwater habitat, with brackish and saline conditions occurring in  
9 the western Delta at times of high tides and low flows into the western Delta.

10 Ten vegetation units mapped in the study area occur within the tidal perennial aquatic natural  
11 community, none of which have special status. Aquatic vegetation in the study area can be separated  
12 into two general categories: floating aquatic vegetation and submerged aquatic vegetation. The  
13 geographic extent of this vegetation changes frequently because it depends on highly variable  
14 physical factors, such as depth, turbidity, water flow, salinity, substrate, and nutrient availability. It  
15 is also subject to management actions, including vegetation clearing using mechanical methods and  
16 herbicide treatments.

17 Floating aquatic vegetation extends over the open-water surface, either as free-floating plants or as  
18 colonies extending from plants rooted in banks. Most floating aquatic vegetation in the Delta  
19 consists of highly invasive nonnative plants such as water hyacinth (*Eichhornia crassipes*), which  
20 commonly occurs in dense floating mats thick enough to create anoxic conditions in ditches and  
21 canals.

22 Floating aquatic vegetation also occurs in sloughs, especially near their source of origin where flows  
23 are slow. Abundant floating aquatic vegetation frequently presents a nuisance to boaters. Even  
24 native floating aquatic species may become overabundant and invasive in nutrient-rich waters of  
25 urban and agricultural watersheds with diminished tidal and freshwater outflows. Floating aquatic  
26 vegetation borders marshes along large sloughs and small tidal channels in the Delta and may

1 accumulate in such large quantities that it may affect marsh vegetation by smothering it with  
2 decomposing masses of debris.

3 Submerged aquatic plants have leaves and stems that are fully submerged for all or nearly all of  
4 their life cycle, and they often have root systems reduced to minimal anchorage structures in pond  
5 or riverbeds. Many native submerged aquatic species, including pondweeds (e.g., sago pondweed  
6 [*Stuckenia pectinata*]) and stoneworts (green algae structurally similar to vascular plants), are  
7 highly valuable food plants for waterfowl and nursery habitat for aquatic invertebrates and fish.  
8 Submerged aquatic vegetation may form patches or beds of extensive bottom “canopy” habitat. In  
9 the Delta, nonnative invasive submerged aquatic species dominate and replace native species in  
10 naturally open-water slough beds. Brazilian waterweed (*Egeria densa*) and alligatorweed  
11 (*Alternanthera philoxeroides*), are invasive and extremely competitive with native species and are  
12 capable of surviving at great water depths. These plants have structural characteristics that create  
13 suitable cover and shelter for predatory nonnative fish in tidal slough beds.

14 Wildlife species associated with tidal aquatic habitats vary with water depth and other habitat  
15 features. Deeper open-water areas without vegetation provide foraging habitat for wildlife such as  
16 terns, gulls, osprey, diving ducks (e.g., ring-necked duck [*Aythya collaris*] and canvasback [*Aythya*  
17 *valisineria*]), and river otters (*Lontra canadensis*), which feed primarily on fish, crayfish, and other  
18 aquatic organisms. Shallower water with submerged or floating aquatic vegetation provides  
19 foraging habitat for reptiles, such as western pond turtle (*Actinemys marmota*), and dabbling ducks,  
20 such as American widgeon (*Mareca americana*) and northern pintail (*Anas acuta*), which feed on a  
21 variety of invertebrates and plant material. Special-status wildlife species occurring in tidal  
22 perennial aquatic natural community include giant garter snake (*Thamnophis gigas*) and western  
23 pond turtle. No special-status plants are characteristic of this community. The community’s  
24 distribution in the study area is mapped in Mapbooks 13-1, 13-2, and 13-3.

25 This community may meet the definition of jurisdictional waters of the United States and be  
26 regulated by USACE under Section 404 of the Clean Water Act (CWA). It may also be regulated by the  
27 State Water Board as waters of the State under the Porter-Cologne Water Quality Control Act  
28 (Porter-Cologne Act).

### 29 **Tidal Mudflat**

30 Tidal mudflat occurs at the edges between tidal perennial aquatic, tidal freshwater emergent, and  
31 tidal brackish emergent wetlands. Because of the land cover datasets used and their underlying  
32 resolutions, tidal mudflat was not mapped separately from these natural community types and,  
33 therefore, is not addressed separately in detail in this chapter.

### 34 **Tidal Brackish Emergent Wetland**

35 The tidal brackish emergent wetland natural community is a transitional community between tidal  
36 perennial aquatic and terrestrial upland communities. In the study area, tidal brackish emergent  
37 wetland exists in the San Francisco Bay saltwater/Delta freshwater mixing zone that extends from  
38 near Collinsville westward to the limits of the statutory Delta. Tidal brackish emergent wetland is  
39 present on the south side of Suisun Bay. The distribution of tidal brackish emergent wetland in the  
40 study area is mapped in Mapbooks 13-1, 13-2, and 13-3.

41 The tidal brackish emergent wetland community in the study area is found on undiked islands, such  
42 as Chipps Island. Tidal brackish emergent wetland in the study area is characterized by tall

1 herbaceous wetland plant species that line the channels down to the depth of mean lower low tide.  
2 Dominant plant species include hard-stem bulrush (*Schoenoplectus acutus*), California bulrush  
3 (*Schoenoplectus californicus*), common reed (*Phragmites australis*), and cattails (*Typha* sp.)  
4 (Whitcraft et al. 2011:14). Dominant species present between the channels and the marsh plain  
5 include pickleweed (*Salicornia* sp.), saltgrass (*Distichlis spicata*), saltmarsh dodder (*Cuscuta salina*),  
6 fathen (*Atriplex prostrata*), and Baltic rush (*Juncus balticus* subsp. *ater*). The marsh plain is usually  
7 free of standing water but may be flooded at very high tides. Wildlife use of channels is similar to  
8 that of tidal perennial aquatic natural community, especially in larger channels. On the marsh plain  
9 and in channels with vegetative cover, typical wildlife present include ornate shrew (*Sorex ornatus*),  
10 song sparrow (*Melospiza melodia*), and red-winged blackbird (*Agelaius phoeniceus*). Several special-  
11 status plant and wildlife species are found within the tidal brackish emergent wetland natural  
12 community, including salt marsh harvest mouse (*Reithrodontomys raviventris*) and Mason's  
13 lilaepsis. The community's distribution is mapped in Mapbooks 13-1, 13-2, and 13-3.

14 This community may meet the definition of jurisdictional waters of the United States and be  
15 regulated by the USACE under Section 404 of the CWA. It may also be regulated by the State Water  
16 Board as waters of the State under the Porter-Cologne Act.

## 17 **Tidal Freshwater Emergent Wetland**

18 The tidal freshwater emergent wetland natural community is typically a transitional community  
19 between tidal perennial aquatic and valley/foothill riparian or terrestrial upland communities  
20 across a range of hydrologic and soil conditions. In the study area, the tidal freshwater emergent  
21 wetland community often occurs at the shallow, slow-moving or stagnant edges of freshwater  
22 waterways or ponds in the intertidal zone and is subject to frequent long-duration flooding. The  
23 distribution of tidal freshwater emergent wetland in the study area is mapped in Mapbooks 13-1,  
24 13-2, and 13-3.

25 Tidal freshwater emergent wetland vegetation naturally occurs along a hydrologic gradient in the  
26 transition zone between open water and terrestrial vegetation such as grasslands or woodlands. In  
27 the study area, there are abrupt transitions to agricultural cover, managed wetlands, and boundaries  
28 formed by levees and other artificial landforms. Twelve vegetation units mapped in the study area  
29 fall within the tidal freshwater emergent wetland natural community.

30 Tidal freshwater emergent wetland is regularly and occasionally flooded tidal marshlands with very  
31 low levels of soil salinity. These communities can be categorized based on their frequency of  
32 inundation. The low-elevation tidal freshwater emergent wetland is influenced by the daily tides and  
33 is flooded more often than not. Middle-elevation tidal freshwater emergent wetland is regularly  
34 flooded, but the soil is exposed above the water level for many hours each day. High-elevation tidal  
35 freshwater emergent wetland is occasionally flooded by tides or flood events but includes  
36 depressions that remain flooded after tides recede.

37 Low-elevation tidal freshwater emergent wetland typically is dominated by tules and occasionally  
38 includes species of cattails. They are highly productive but support few species other than tules that  
39 tolerate deep, prolonged tidal flooding. The middle-elevation tidal freshwater emergent wetland is  
40 more diverse in plant species (e.g., bur-reed [*Sparganium* sp.], broadleaf arrowhead [*Sagittaria*  
41 *latifolia*], and water smartweed [*Persicaria amphibia*]), even though this community may also be  
42 dominated by tules (*Schoenoplectus* spp.).

1 Middle-elevation tidal freshwater emergent wetland is less abundant than low-elevation tidal  
2 freshwater emergent wetland and often represents a more mature marsh condition with long  
3 periods of peat accumulation or sediment deposition. Historically, this plant community was much  
4 more widespread, but much of its habitat has been converted to other land uses, such as agriculture.  
5 Invasive nonnative plants, such as common reed (*Phragmites australis*) and yellow flag iris (*Iris*  
6 *pseudacorus*), tend to invade this species-rich freshwater zone. The middle-elevation tidal  
7 freshwater emergent wetland zone grades into the uppermost end of tidal freshwater marsh (high-  
8 elevation intertidal marsh zone).

9 The high-elevation tidal freshwater emergent wetland zone can be dominated by grass and grasslike  
10 species, such as Baltic rush, creeping wildrye (*Elymus triticoides*), and saltgrass. It typically includes  
11 large patches of yerba mansa (*Anemopsis californica*) and salt heliotrope (*Heliotropium*  
12 *curassavicum*). Special-status plant species commonly found in this plant community include Suisun  
13 marsh aster (*Symphotrichum lentum*) and woolly rose-mallow (*Hibiscus lasiocarpus* var.  
14 *occidentalis*). Large thickets of nonnative Himalayan blackberry (*Rubus armeniacus*) invade high-  
15 elevation tidal freshwater emergent wetland, converting the marsh to riparian scrub thickets. High-  
16 elevation tidal freshwater emergent wetland may naturally grade into low-elevation grasslands  
17 (dense stands of saltgrass and creeping wildrye) or seasonal wetland transition zones, or it may end  
18 abruptly at the edges of steep levees or eroded riverbanks. This high-elevation type of tidal  
19 freshwater marsh is also rare but is well developed in a few locations in the Delta.

20 Wildlife species composition in sparsely vegetated areas in low-elevation tidal freshwater emergent  
21 wetland is similar to the composition described above under tidal perennial aquatic natural  
22 community. Other wildlife that use these productive wetlands as foraging habitat and the dense  
23 vegetation as cover, especially in the low and middle elevations, include western pond turtle, wading  
24 birds (egrets and herons), waterfowl (ducks, geese, and swans), shorebirds (e.g., rails, plovers,  
25 sandpipers), and perching birds. Common nesting birds include red-winged blackbird, marsh wren  
26 (*Cistothorus palustris*), common yellowthroat (*Geothlypis trichas*), and black-crowned night heron  
27 (*Nycticorax nycticorax*). American beaver (*Castor canadensis*) and muskrat (*Ondatra zibethicus*)  
28 forage on marsh plants and use them for cover and den material. Several special-status plant and  
29 wildlife species occur in the tidal freshwater emergent wetland natural community, including side-  
30 flowering skullcap (*Scutellaria lateriflora*) and giant garter snake.

31 This community may meet the definition of jurisdictional waters of the United States and be  
32 regulated by the USACE under Section 404 of the CWA. It may also be regulated by the State Water  
33 Board as waters of the State under the Porter-Cologne Act.

### 34 **Valley/Foothill Riparian**

35 Broadly defined, the valley/foothill riparian natural community is often a transition zone between  
36 aquatic and upland terrestrial habitat and is found in a wide range of geologic, soil, and other  
37 environmental conditions (e.g., variable light and nutrient availability) throughout the study area  
38 (Bay Institute 1998:2-27-2-29; Vaghti and Greco 2007:425-455). The current extent of the  
39 valley/foothill riparian community represents a small proportion of its historical extent in the study  
40 area. Historically, valley/foothill riparian vegetation was distributed along all major and minor  
41 waterways and floodplains throughout the study area (Bay Institute 1998:2-12). The loss of riparian  
42 vegetation throughout California, estimated to be 85%–95%, was caused by human activities, such  
43 as river and stream channelization, levee building, vegetation removal to stabilize levees, and  
44 extensive agricultural and urban development (Riparian Habitat Joint Venture 2004:6).

1 Valley/foothill riparian communities occur in the study area most often as long, linear patches  
2 separating other terrestrial biological communities and agricultural or urban land, or in low-lying,  
3 flood-prone patches near river bends, canals, or breached levees (Mapbooks 13-1, 13-2, and 13-3).  
4 An exception is in conservation areas where large tracts of riparian forest are being restored, such  
5 as the Cosumnes River Preserve. Generally, however, this natural community is located along many  
6 of the major and minor waterways, oxbows, and levees in the study area, including the Sacramento  
7 River, the Sacramento River Deep Water Ship Channel, the Yolo Bypass, and channels of the San  
8 Joaquin River and the Delta. Patches of riparian vegetation are also found on the interior of leveed  
9 Delta islands, along drainage channels and pond margins, and in abandoned, low-lying fields.

10 Thirty-six vegetation units mapped in the study area fall within the valley/foothill riparian natural  
11 community. These assemblages are discussed below in general terms under the riparian scrub, and  
12 riparian forest and woodland subcategories. Several special-status wildlife species occur in  
13 valley/foothill riparian natural community, including valley elderberry longhorn beetle (*Desmocerus*  
14 *californicus dimorphus*), Swainson's hawk, and white-tailed kite (*Elanus leucurus*). No special-status  
15 plants are characteristic of this natural community, although many special-status plants in tidal  
16 wetlands occur where tidal wetlands and riparian communities intergrade. In addition, 15  
17 vegetation alliances occurring in the valley/foothill riparian natural community are considered to  
18 have special status (Box Elder Alliance, Buttonwillow Alliance, California Rose Alliance, California  
19 Sycamore Alliance, Wild Grape Alliance, Fremont Cottonwood Alliance, Goodding Willow Alliance,  
20 Gumplant Alliance, Hind's Walnut Alliance, Oregon Ash Alliance, Red Osier Alliance, Red Willow  
21 Alliance, Shining Willow Alliance, Valley Elderberry Alliance, Valley Oak Alliance). The community's  
22 distribution in the study area is mapped in Mapbooks 13-1, 13-2, and 13-3.

### 23 **Riparian Scrub**

24 Riparian scrub in the study area consists of woody riparian shrubs forming dense thickets. Species  
25 may include willows (*Salix* sp.), blackberries (*Rubus* sp.), buttonwillow (*Cephalanthus occidentalis*),  
26 mulefat (*Baccharis salicifolia* subsp. *salicifolia*), and other shrub species. These thickets are usually  
27 associated with higher, sloping, better-drained edges of marshes, or topographic high areas, such as  
28 levee remnants and elevated flood deposits. Thickets may occur along shorelines of ponds or banks  
29 of channels in tidal or nontidal freshwater habitats. Willow thickets and dead branches or trees  
30 (snags) in riparian woodland provide important habitat for a wide range of wildlife species. During  
31 extreme floods, dense and tall riparian willow thicket canopies may remain partially above water  
32 levels, trap debris and sediment, and act as permeable barriers to wave energy traveling across open  
33 water. Nonnative Himalayan blackberry thickets are a common element of riparian scrub  
34 communities along levees and throughout pastures within the levees. Understory shrubs provide  
35 cover for mammals such as desert cottontail (*Sylvilagus audubonii*) and for ground-nesting birds,  
36 such as spotted towhee (*Pipilo maculatus*), that forage among the vegetation and leaf litter.

37 Riparian scrub in areas subject to frequent flooding or ponding also may meet the definition as  
38 wetlands subject to USACE jurisdiction under Section 404 of the CWA, and waters of the State under  
39 the Porter-Cologne Act.

### 40 **Riparian Forest and Woodland**

41 The study area supports winter-deciduous, broadleaved trees, up to 60 feet in height in the riparian  
42 forest and woodlands, where the canopy cover ranges from relatively open to very dense. At  
43 present, riparian forest and woodland communities dominated by tree species are mostly limited to  
44 narrow bands along sloughs, channels, rivers, and other freshwater features throughout the study

1 area. Cottonwoods and willow mixed with Oregon ash (*Fraxinus latifolia*), box elder (*Acer negundo*),  
2 and California sycamore (*Platanus racemosa*) are the most common riparian trees in central  
3 California. Valley oak (*Quercus lobata*) is common in riparian areas in the Central Valley, as are  
4 species of walnut. Riparian woodland often has a shrubby understory consisting of the similar  
5 species discussed above in riparian scrub. Equivalent communities, as described by Holland  
6 (1986:55-57), include great valley cottonwood riparian forest, great valley mixed riparian forest,  
7 great valley oak riparian forest, and white alder riparian forest.

8 Riparian habitat supports a wide variety of wildlife species. It provides structure and function for  
9 live-in habitat; provides cover, food, and water resources; and also serves as important dispersal,  
10 movement, and connectivity habitat for a wide range of taxonomic groups ranging from  
11 invertebrates to birds to large mammals. Riparian trees are used for nesting, foraging, and  
12 protective cover by many bird species, including black-headed grosbeak (*Pheucticus*  
13 *melanocephalus*), tree swallow (*Tachycineta bicolor*), Bewick's wren (*Thryomanes bewickii*), and  
14 Cooper's hawk (*Accipiter cooperii*). Riparian canopies provide nesting and foraging habitat for  
15 common mammals, such as western gray squirrel (*Sciurus griseus*) as well as birds, bats, and  
16 terrestrial and semi-aquatic mammals. Understory shrubs provide cover for mammals such as  
17 desert cottontail and for ground-nesting birds, such as spotted towhee (*Pipilo maculatus*), that  
18 forage among the vegetation and leaf litter. Mammals such as raccoon (*Procyon lotor*) and opossum  
19 (*Didelphis virginiana*) and many other species spanning many taxa benefit from the structure and  
20 cover as well as the variety of plants, berries, invertebrates, small mammals, and bird eggs that  
21 provide food for a wide variety of species.

22 Riparian forest and woodlands are considered sensitive communities because they have sustained  
23 considerable losses throughout the state. Riparian forest and woodland that is subject to frequent  
24 flooding or ponding may also qualify as wetlands subject to USACE jurisdiction under Section 404 of  
25 the CWA, and waters of the State under the Porter-Cologne Act.

## 26 **Nontidal Perennial Aquatic**

27 Nontidal perennial aquatic natural communities in the Delta can range in size from small ponds in  
28 uplands to large lakes, such as North and South Stone Lakes. The nontidal perennial aquatic natural  
29 community can be found in association with any terrestrial habitat and can transition into nontidal  
30 freshwater perennial emergent wetland and valley/foothill riparian. This natural community is  
31 differentiated from the tidal perennial aquatic natural community described above by a physical  
32 separation from the tidally influenced sloughs and channels in the Delta. Ten vegetation mapping  
33 units fall within the nontidal perennial aquatic natural community in the study area.

34 Dominant plant species present in the nontidal perennial aquatic natural community include most of  
35 the species mentioned above for the tidal perennial aquatic natural community, including floating  
36 water primrose (*Ludwigia peploides* subsp. *montevidensis*), water hyacinth, and Brazilian  
37 waterweed. Vegetation in the nontidal perennial aquatic community can be similarly characterized  
38 as floating aquatic vegetation and submerged aquatic vegetation (see description above).

39 Nontidal perennial aquatic natural community provides foraging habitat and winter roosting habitat  
40 for wildlife that depends on other habitats for breeding and cover. Typical species include pied-  
41 billed grebe (*Podilymbus podiceps*), western grebe (*Aechmophorus occidentalis*), ruddy duck (*Oxyura*  
42 *jamaicensis*), canvasback, bufflehead (*Bucephala albeola*), and river otter. Several special-status  
43 plant and wildlife species occur in the nontidal perennial aquatic natural community, including  
44 watershield (*Brasenia schreberi*), western pond turtle, giant garter snake, and California red-legged



1 frog (*Rana draytonii*). The community's distribution in the study area is mapped in Mapbooks 13-1,  
2 13-2, and 13-3.

3 This community may meet the definition of jurisdictional waters of the United States and be  
4 regulated by USACE under Section 404 of the CWA. It may also be regulated by a California Regional  
5 Water Quality Control Board (RWQCB) as waters of the State under the Porter-Cologne Act.

## 6 **Nontidal Brackish Emergent Wetland**

7 The nontidal brackish emergent wetland natural community is a transitional community between  
8 tidal perennial aquatic and terrestrial upland communities. These emergent wetlands typically  
9 occur on the land side of the Delta levees. In the study area, nontidal brackish emergent wetland  
10 occurs mostly in the former tidelands near Collinsville but is also scattered along coastal areas of  
11 Contra Costa County and in the Yolo Basin. The distribution of nontidal brackish emergent wetland  
12 in the study area is mapped in Mapbooks 13-1, 13-2, and 13-3.

13 Nontidal brackish emergent wetlands in the study area are found in areas that were formerly tidal  
14 but have been disconnected from tidal action by dikes or other hydrological changes, similar to the  
15 alkaline seasonal wetlands in Contra Costa County (Stanford et al. 2011:61–63). The soils remain  
16 highly saline, but the hydrology is currently seasonal and driven by precipitation and other nontidal  
17 sources. The characteristic plant species of nontidal brackish emergent wetland include pickleweed,  
18 saltgrass, fathen (*Atriplex prostrata*), alkali heath (*Frankenia salina*), and common reed. Common  
19 wildlife present include ornate shrew, song sparrow, and red-winged blackbird. Special-status  
20 wildlife species occurring in nontidal brackish perennial emergent wetland natural community  
21 include California black rail and tricolored blackbird (*Agelaius tricolor*).

22 This community may meet the definition of jurisdictional waters of the United States and be  
23 regulated by the USACE under Section 404 of the CWA. It may also be regulated by a California  
24 RWQCB as waters of the State under the Porter-Cologne Act.

## 25 **Nontidal Freshwater Perennial Emergent Wetland**

26 The nontidal freshwater perennial emergent wetland community is composed of permanently  
27 saturated wetlands, including meadows, dominated by emergent plant species that do not tolerate  
28 permanent saline or brackish conditions (CALFED Bay-Delta Program 2000:140). Thirteen  
29 vegetation mapping units fall within this natural community. Nontidal freshwater perennial  
30 emergent wetland communities in the study area occur in small fragments along the edges of the  
31 nontidal perennial aquatic and valley/foothill riparian natural communities (Mapbooks 13-1, 13-2,  
32 and 13-3). These emergent wetlands typically occur on the land side of the Delta levees. Shallow  
33 emergent wetlands (i.e., water less than 3 feet deep) are dominated by thick, tall, highly productive  
34 stands of tules and cattails.

35 Much of the nontidal freshwater perennial emergent wetland that occurs in the study area is  
36 disturbed, either through hydrologic disturbance or by physical disturbances. Broad, deeply flooded  
37 areas that are covered by open water most of the year and that develop emergent mud beds late in  
38 the growing season effectively alternate between seasonal ponds and freshwater marshes. Physical  
39 disturbances are direct, such as channel dredging, or indirect as a result of adjacent agricultural,  
40 commercial, or residential activities. Disturbed nontidal freshwater perennial emergent wetland  
41 that occurs in ditches supports a higher proportion of cattails than undisturbed nontidal freshwater  
42 marshes. Characteristic forb and grasslike species associated with nontidal freshwater perennial

1 emergent wetland include a mix of native and nonnative species, such as cocklebur (*Xanthium*  
2 *strumarium*), curly dock (*Rumex crispus*), several knotweed species (*Polygonum* sp.), common  
3 spikerush (*Eleocharis macrostachya*), rabbit-foot grass (*Polypogon monspeliensis*), and dallisgrass  
4 (*Paspalum dilatatum*). The higher elevation edges of freshwater marsh gradients may be  
5 characterized by abrupt transitions to terrestrial vegetation, or they may transition into vegetation  
6 of alkaline seasonal wetlands, riparian woodland, or riparian scrub.

7 Nontidal freshwater perennial emergent wetland provides important foraging, breeding, and winter  
8 roosting habitat for a variety of wildlife species; dense emergent vegetation provides concealment  
9 from predators. Reptiles and amphibians associated with marsh habitats include common garter  
10 snake (*Thamnophis sirtalis*), Sierran treefrog (*Pseudacris sierra*), and bullfrog (*Lithobates*  
11 *catesbeianus*). Locally common to abundant wading birds (egrets and herons), waterfowl (ducks,  
12 geese, and swans), shorebirds (e.g., rails, plovers, sandpipers), and perching birds (e.g., red-winged  
13 blackbird, marsh wren, common yellowthroat) use nontidal marsh habitat for foraging, cover, and  
14 nesting. American beavers and muskrats forage on marsh plants and use them for cover and den  
15 material. River otters forage on fish, amphibians, and invertebrates and use the cover provided by  
16 thickets and tall wetland plants. Several special-status plant and wildlife species occur in nontidal  
17 freshwater perennial emergent wetland natural community, including Sanford's arrowhead  
18 (*Sagittaria sanfordii*), woolly rose-mallow (*Hibiscus lasiocarpus* var. *occidentalis*), California red-  
19 legged frog, northern harrier (*Circus hudsonius*), and Modesto song sparrow (*Melospiza melodia*  
20 *mailliardi*).

21 This community may meet the definition of jurisdictional waters of the United States and regulated  
22 by the USACE under Section 404 of the CWA. It may also be regulated by the State Water Board as  
23 waters of the State under the Porter-Cologne Act.

## 24 **Alkaline Seasonal Wetland Complex**

25 Alkaline seasonal wetland complex occurs on alkaline or salt-rich soils with ponded or saturated soil  
26 conditions for prolonged periods during the growing season. The vegetation of alkaline seasonal  
27 wetlands is composed of high pH-tolerant or salt-tolerant plant species that are also adapted to  
28 wetland conditions. This natural community "complex" includes both seasonally ponded and  
29 saturated wetlands and the surrounding matrix of grassland. It is typically found where salts  
30 accumulated through evaporation, or in upland locations, such as basin rims and seasonal drainages,  
31 that receive salts in runoff from distant upslope salt-bearing rock. Extensive areas of alkaline  
32 seasonal wetlands were historically present near the Clifton Court Forebay, but only about 30% of  
33 the historical extent remain (Stanford et al. 2011:60–63, Whipple et al. 2012:193–194) (Mapbooks  
34 13-1, 13-2, and 13-3).

35 The composition of alkaline seasonal wetland complex can be highly variable from site to site, and  
36 these wetlands may include species typically associated with the Holland communities of alkaline  
37 grassland, alkaline sink, chenopod scrub, brackish marsh, valley sink scrub, and alkaline vernal  
38 pools (Holland 1986:18–19, 35, 38–39). Nine vegetation mapping units are associated with this  
39 natural community. Alkaline seasonal wetlands can support a richness of species, and they often  
40 provide suitable habitat for several special-status plant species. Dominant grasses in alkaline  
41 seasonal wetlands and surrounding grassland include saltgrass and wild barley (*Hordeum* spp.). The  
42 associated herb and shrub cover consists of salt-tolerant species, including saltbush (*Atriplex* sp.),  
43 alkali heath, alkali weed (*Cressa truxillensis*), alkali mallow (*Malvella leprosa*), and common  
44 spikeweed (*Centromadia pungens*). The study area includes small stands of alkaline sink scrub (also

1 known as valley sink scrub), which are characterized by iodine bush (*Allenrolfea occidentalis*).  
2 Alkaline seasonal wetland complex is rare in the study area, occurring primarily around Clifton  
3 Court Forebay and southern Solano County.

4 During winter and spring, when alkaline seasonal wetlands are filled with water, plants, and aquatic  
5 life, the wetlands act as an important foraging habitat for a variety of common wildlife species,  
6 including great blue heron (*Ardea herodias*) and great egret (*Ardea alba*). Alkaline seasonal wetlands  
7 support common wildlife species, including dabbling ducks, invertebrates such as various native bee  
8 species, and reptiles and amphibians, such as the common garter snake and Sierran treefrog. Several  
9 special-status plant and wildlife species occur in alkaline seasonal wetland complex natural  
10 community, including San Joaquin spearscale (*Extriplex joaquinana*) and California linderiella  
11 (*Linderiella occidentalis*).

12 This community may meet the definition of jurisdictional waters of the United States and be  
13 regulated by the USACE under Section 404 of the CWA. It may also be regulated by a California  
14 RWQCB as waters of the State under the Porter-Cologne Act.

### 15 **Vernal Pool Complex**

16 The vernal pool complex natural community is characterized by interconnected and isolated groups  
17 of vernal pool wetlands and seasonal swales in the matrix of the grassland natural community  
18 (described below). The vernal pool complex community is rare in the study area and is generally  
19 contiguous with vernal pool habitat adjacent to the study area (Mapbooks 13-1, 13-2, and 13-3).  
20 Details of the methods used to map the vernal pool complex community are presented above in the  
21 introduction to Section 13.1.2.1, *Natural Community Mapping Methods*. In the study area, vernal pool  
22 complex occurs in the vicinity of Stone Lakes National Wildlife Refuge, the Yolo Bypass,  
23 southeastern Solano County, Jepson Prairie, and Clifton Court Forebay.

24 Vernal pools are seasonal wetlands that form in shallow depressions underlain by hardpan or a  
25 dense clay subsurface layer. These depressions fill with rainwater and surface runoff; the subsurface  
26 layers restrict infiltration into the subsoil and the depressions remain inundated throughout the  
27 winter and sometimes as late as early summer. Vernal pools are found in areas of level or gently  
28 undulating topography in the lowlands of California, especially in the grasslands of the Central  
29 Valley. Although these wetlands are typically small, some vernal pools can reach several acres in  
30 size. Rising spring temperatures cause the water in vernal pools to evaporate, promoting the growth  
31 of concentric bands of various plant species, especially native wildflowers, along the shrinking edge  
32 of the pool. Vernal pool vegetation in California is characterized by a high percentage of native  
33 species, several of which have restricted ranges. Many plant species, and a number of animal species  
34 associated with vernal pools, are federally or state listed as rare, threatened, or endangered.

35 During winter and spring, when vernal pools or seasonal wetlands are filled with water, plants, and  
36 aquatic life, they act as an important foraging habitat for a variety of common wildlife species,  
37 including dabbling ducks, shorebirds such as American avocets (*Recurvirostra americana*) and  
38 greater yellowlegs (*Tringa melanoleuca*), invertebrates such as various native bee species, and  
39 reptiles and amphibians, such as the common garter snake and Sierran treefrog. The uplands that  
40 surround vernal pools also provide habitat for pollinators of native vernal pool plants (e.g., solitary  
41 bees) as well as refugia for amphibian species that utilize these pools for breeding. Several special-  
42 status plant and wildlife species occur in vernal pool complex natural community, including dwarf  
43 downingia (*Downingia pusilla*), legenere (*Legenere limosa*), vernal pool fairy shrimp (*Branchinecta*

1 *lynchi*), western spadefoot toad (*Spea hammondi*), and California tiger salamander (*Ambystoma*  
2 *californiense*).

3 This community may meet the definition of jurisdictional waters of the United States and regulated  
4 by the USACE under Section 404 of the CWA. It may also be regulated by a California RWQCB as  
5 waters of the State under the Porter-Cologne Act.

## 6 **Other Seasonal Wetlands**

7 The other seasonal wetlands community encompasses all the remaining seasonal wetland  
8 communities other than vernal pools and alkaline seasonal wetlands. These areas mapped by DWR  
9 consist of seasonally ponded, flooded, or saturated soils generally dominated by grasses, sedges, or  
10 rushes. Most of these wetlands were mapped within croplands. Other seasonal wetlands are  
11 freshwater wetlands characterized by ponded or saturated soil conditions during winter and spring  
12 and by dry soil conditions throughout summer and fall until the first substantial rainfall. The  
13 vegetation of seasonal wetlands is typically composed of wetland generalist species such as hyssop  
14 loosestrife (*Lythrum hyssopifolia*), cocklebur, dallisgrass, Bermuda grass (*Cynodon dactylon*),  
15 barnyard grass (*Echinochloa crus-galli*), and Italian ryegrass (*Festuca perennis*), which typically  
16 occur in frequently disturbed sites. Species dominance varies according to flooding regime.

17 Special-status species potentially occurring in other seasonal wetlands include vernal pool fairy  
18 shrimp. The community's distribution in the study area is mapped in Mapbooks 13-1, 13-2, and  
19 13-3.

20 This community may meet the definition of jurisdictional waters of the United States and regulated  
21 by the USACE under Section 404 of the CWA. It may also be regulated by a California RWQCB as  
22 waters of the State under the Porter-Cologne Act.

## 23 **Grassland**

24 The grassland community is a spectrum ranging from natural to intensively managed vegetation  
25 dominated by grasses. At the more natural end of the spectrum, this natural community consists of  
26 introduced or native annual and perennial grasses and forbs (non-grass herbaceous species). At the  
27 intensively managed end of the spectrum, it includes non-irrigated pasturelands. Grasslands are  
28 often found adjacent to wetland and riparian habitats and are the dominant community on levees in  
29 the Delta. The distribution of the grassland community in the study area is mapped in Mapbooks 13-  
30 1, 13-2, and 13-3.

31 Grassland communities within the study area are generally dominated by nonnative species, such as  
32 wild oats (*Avena fatua*), various bromes (*Bromus* sp.) and barleys (*Hordeum* sp.), Italian ryegrass,  
33 filarees (*Erodium* sp.), mustards (*Brassica* sp.), wild radish (*Raphanus sativus*), mallows (*Malva* sp.),  
34 vetches (*Vicia* sp.), and star-thistles (*Centaurea* sp.). They may also support infrequent native annual  
35 and perennial grasses and forbs. In some areas of the Delta, the grassland community is interspersed  
36 with vernal pool complex, alkaline seasonal wetland complex, and other natural seasonal wetland  
37 natural community types. *A Manual of California Vegetation* (Sawyer et al. 2009) recognizes the  
38 broad spectrum of grassland types and includes vegetation alliances ranging from those that are  
39 completely dominated by nonnative annual grasses to grasslands that are dominated by perennial  
40 native grasses. Within the study area, the grassland community can include special-status plants,  
41 such as Jepson's coyote-thistle (*Eryngium jepsonii*), Heckard's peppergrass (*Lepidium latipes* var.  
42 *heckardii*), and saline clover (*Trifolium hydrophilum*).

1 The grassland community designation has also been applied to areas that have been cleared of their  
2 natural vegetation cover, such as levee faces and edges of agricultural fields and roads. Vegetation in  
3 these areas is best characterized as ruderal. Ruderal vegetation is dominated by herbaceous,  
4 nonnative plant species, some of which are considered invasive (see discussion in Section 13.1.5,  
5 *Invasive and Noxious Plant Species*). Representative species that occur in ruderal grassland areas are  
6 common mallow (*Malva neglecta*), bull thistle (*Cirsium vulgare*), bindweed (*Convolvulus arvensis*),  
7 poison hemlock (*Conium maculatum*), wild lettuce (*Lactuca serriola*), Russian thistle (*Salsola*  
8 *tragus*), yellow star-thistle (*Centaurea solstitialis*), pampas grass (*Cortaderia jubata*), sweet fennel  
9 (*Foeniculum vulgare*), and many nonnative grasses, including wild oats, bromes, barleys, and  
10 Bermuda grass. Ruderal vegetation on maintained levees throughout the Delta can be a persistent  
11 source of seeds of nonnative plants, some of which are considered invasive. Some native annuals,  
12 such as common spikeweed and willowherb (*Epilobium* sp.), are also common.

13 Fallow fields and disturbed fields (ruderal lands) often are dense, low-diversity stands of nonnative  
14 invasive (“weedy”) plants that provide limited wildlife values. Wildlife habitat values can be affected  
15 by nonnative invasive plant species through several means, including physical alteration of habitat  
16 structure (e.g., the formation of dense stands that restrict wildlife movement, or a reduction in  
17 suitable cover and nest sites), altering foodwebs (e.g., reducing invertebrate prey populations), and  
18 disrupting biogeochemical processes (e.g., altering the timing of carbon availability).

19 Ruderal and grassland communities provide foraging, breeding, and cover habitat value for a variety  
20 of wildlife species, including gopher snake (*Pituophis catenifer*), western racer (*Coluber constrictor*  
21 *mormon*), western meadowlark (*Sturnella neglecta*), red-tailed hawk (*Buteo jamaicensis*), western  
22 harvest mouse (*Reithrodontomys megalotis*), and California vole (*Microtus californicus*). Wildlife  
23 communities in fallow and ruderal fields are often similar to those in cultivated row crop or silage  
24 fields. The absence of active cultivation increases the potential for successful bird nesting; however,  
25 these habitats provide limited breeding habitat for grassland-associated wildlife, such as western  
26 meadowlark, American goldfinch (*Spinus tristis*), and red-winged blackbird. Several special-status  
27 plant and wildlife species occur in grasslands, including alkali milk-vetch (*Astragalus tener* var.  
28 *tener*), coast horned lizard (*Phrynosoma blainvillii*), San Joaquin coachwhip (*Masticophis flagellum*  
29 *ruddocki*), and western burrowing owl (*Athene cunicularia*).

## 30 **Agricultural**

31 Agricultural is the predominant land cover type in the study area. These areas are largely croplands  
32 but also include unvegetated areas adjacent to fields, fallowed areas, farm roads, and agricultural  
33 ditches. Croplands consist of both seasonal and perennial crop types. Perennial crop types include  
34 orchards and vineyards. The distribution of seasonal crops varies annually within the study area,  
35 depending on crop-rotation patterns and market forces. General cropping practices result in  
36 monotypic stands of vegetation for the growing season and bare ground in fall and winter. Several  
37 special-status wildlife species are associated with croplands, for example, greater sandhill crane and  
38 tricolored blackbird. No special-status plants are associated with agricultural areas. Agricultural  
39 land cover is mapped in Mapbooks 13-1, 13-2, and 13-3. Some of the principal crop types and their  
40 value to wildlife are discussed below.

## 41 **Alfalfa**

42 Alfalfa (*Medicago sativa*) is an irrigated, intensively mowed, leguminous crop that constitutes a  
43 dynamic habitat. Vegetation structure varies with the growing, harvesting, and fallowing cycles.

1 Alfalfa is rotated periodically with other crops, such as vegetables and cereal grains. It is a very  
2 productive crop that does not require frequent tilling, so it can support large populations of small  
3 mammals (e.g., voles) and invertebrate species. As a result, it provides high-value foraging habitat  
4 for wildlife, including wading birds, shorebirds, blackbirds, and hawks. Some of these species, such  
5 as shorebirds, use the fields when they are periodically flood-irrigated. Alfalfa can be particularly  
6 important to Swainson's hawk, white-tailed kite, and other raptor species, which capitalize on high  
7 prey densities and cycles of increased prey availability when the fields are being irrigated and  
8 mowed.

### 9 **Irrigated Pasture**

10 Irrigated pastures are managed grasslands that are not typically tilled or disturbed frequently. They  
11 are usually managed with a low structure of native herbaceous plants, cultivated species, or a  
12 mixture of both. Irrigated pastures provide breeding opportunities for ground-nesting birds and  
13 burrowing animals, such as burrowing owl, western meadowlark, California ground squirrel  
14 (*Otospermophilus beechyi*), and Botta's pocket gopher (*Thomomys bottae*). The open structure of  
15 irrigated pastures provides foraging habitat for grassland-foraging wildlife, such as red-tailed hawk,  
16 northern harrier, American kestrel (*Falco sparverius*), and coyote (*Canis latrans*).

### 17 **Rice**

18 Rice is a flood-irrigated crop of seed-producing annual grasses. It is maintained in a flooded state  
19 until near maturation. Rice is usually grown in areas that previously supported natural wetlands,  
20 and many wetland wildlife species use rice fields, especially giant garter snake, waterfowl and  
21 shorebirds. Waste grain also provides food for species such as ring-necked pheasant (*Phasianus*  
22 *colchicus*) and sandhill crane. Other wildlife that use rice fields include bullfrog, and wading birds  
23 that forage on aquatic invertebrates and small vertebrates, such as red swamp crayfish  
24 (*Procambarus clarkii*) and small fishes. Rice fields provide habitat for a range of wintering waterfowl  
25 species in the Yolo Bypass. In particular, the practice of flooding rice fields in winter to allow rice  
26 stubble to rot, instead of burning rice stubble in the fall, provides a wide variety of ducks and geese  
27 an opportunity to loaf or forage in rice fields in winter and important foraging habitat for  
28 shorebirds. Fallow rice fields also provide important habitat for geese, cranes, large herons, and  
29 egrets, and can also provide breeding habitat for waterfowl such as mallards (*Anas platyrhynchos*)  
30 and gadwall (*Mareca strepera*).

### 31 **Other Cultivated Crops**

32 Other cultivated crops include grain and seed crops, as well as row crops and silage. Grain and seed  
33 crops are annual grasses that are grown in dense stands and include corn, wheat, barley, and others.  
34 Because the dense growth makes it difficult to move through these fields, most of the value to  
35 wildlife is derived during the early growing period and especially following the harvest, when waste  
36 grain is accessible to waterfowl and other birds, such as sandhill cranes. In some areas of the Delta,  
37 grain fields support a substantial proportion of the sandhill crane population that winters in  
38 California and are used by tricolored blackbird for foraging as well.

39 Although generally of lesser value to wildlife than native habitats, row crop and silage fields often  
40 support abundant populations of small mammals, such as western harvest mouse and California  
41 vole. These species in turn attract predators such as gopher snake, western racer, American kestrel,  
42 and red-tailed hawk. Other reptile and bird species prey on the insect populations abundant in row  
43 crop and silage fields, including western fence lizard (*Sceloporus occidentalis*), Brewer's blackbird

1 (*Euphagus cyanocephalus*), American crow (*Corvus brachyrhynchos*), and the nonnative European  
2 starling (*Sturnus vulgaris*).

### 3 **Orchards**

4 Orchards are habitats dominated by a single tree species. Trees are usually kept fairly low and  
5 bushy, with a mostly closed canopy and an open understory. Orchards usually are grown on fertile  
6 land that formerly supported diverse and productive natural habitats and wildlife. Orchard habitats  
7 are used by several common woodland-associated species, such as western gray squirrel, American  
8 robin (*Turdus migratorius*), red-tailed hawk, bats, and the nonnative black rat (*Rattus rattus*). The  
9 western red bat (*Lasiurus blossevillii*) (a state species of special concern, see Section 13.1.3, *Special-*  
10 *Status Species*) is known to roost in orchards, which may serve as an alternative habitat to the  
11 species' more preferred habitat of large cottonwoods, sycamores, and oaks (Pierson et al. 2006:1).

### 12 **Vineyards**

13 Vineyards are single-species vines grown in rows on trellises. Rows are normally formed by  
14 intertwining vines, with open spaces between the rows, and movement between rows is restricted.  
15 The spaces between rows either are barren soil or are composed of a cover crop of natural or  
16 domesticated herbaceous plants. Vineyards are usually grown on fertile land that formerly  
17 supported diverse and productive natural habitats and wildlife. Except for some common species,  
18 such as mourning dove (*Zenaida macroura*), and raptors that use perches and nest boxes installed to  
19 attract raptors to control pest species, vineyards provide little wildlife habitat.

### 20 **Developed Lands**

21 Additional lands in the study area that were not designated with a natural community type are  
22 characterized here as developed lands. Developed lands include lands with residential, industrial,  
23 and urban land uses, as well as landscaped areas, riprap, road surfaces, and other transportation  
24 facilities. Developed lands support some common plant and wildlife species, whose abundance and  
25 species richness vary with the intensity of development. Dense urban areas support less wildlife  
26 than less dense suburban settings. Suburban areas with mature trees (ornamental or native) can  
27 approximate a natural environment and more native species may occur than in other urban settings.  
28 Bird species include house sparrow (*Passer domesticus*), house finch (*Haemorhous mexicanus*),  
29 western scrub-jay (*Aphelocoma californica*), and European starling in more urban zones; wren  
30 (*Chamaea fasciata*), bushtit (*Psaltriparus minimus*), white-tailed kite, red-tailed hawk, red-  
31 shouldered hawk (*Buteo lineatus*), and California quail (*Callipepla californica*) occur in more  
32 suburban environments.

33 Mammal species in urban residential areas include bats, raccoon, opossum, and striped skunk  
34 (*Mephitis mephitis*), with black-tailed deer (*Odocoileus hemionus*) and black-tailed jackrabbit (*Lepus*  
35 *californicus*) in more suburban settings. California slender salamander (*Batrachoseps attenuatus*),  
36 gopher snake, and western fence lizard could also be present in these areas.

37 Riprap on levees provides potential upland habitat for a number of aquatic wildlife species,  
38 including the federally and state-listed giant garter snake. Riprap on levees provides a thermal  
39 gradient, warm surfaces and cooler underground refuges, similar to burrows adjacent to aquatic  
40 habitats in locations where burrows may be limited.

### 1 **13.1.2.3 Special-Status Communities**

2 Eleven of the natural community types occurring in the study area are, for the purposes of this Draft  
3 EIR, identified as special-status natural communities. These communities are considered to have  
4 special status because they include specific vegetation alliances that are recognized by CDFW as  
5 having limited distribution statewide or within a county or region (California Natural Diversity  
6 Database [CNDDDB] Rank of S1–S3) or because they contain wetlands and other waters that are  
7 protected under federal and state laws. Federal and state laws and regulations applicable to special-  
8 status natural communities include:

- 9 • California Environmental Quality Act (CEQA)
- 10 • Section 1602 of the California Fish and Game Code
- 11 • Sections 401 and 404 of the Clean Water Act (CWA)
- 12 • California’s Porter-Cologne Water Quality Control Act (Porter-Cologne Act)

13 Special-status natural communities may be of special concern to resource agencies and conservation  
14 organizations for a variety of reasons, including their locally or regionally declining status or  
15 because they provide important habitat to common and special-status species. Many of these  
16 habitats or their constituent plant alliances and associations are monitored and reported in the  
17 CNDDDB, which is maintained by CDFW. The following natural communities, all of which are found  
18 within the study area, are considered to be special-status natural communities or to include special-  
19 status species alliances.

- 20 • Tidal perennial aquatic
- 21 • Tidal brackish emergent wetland
- 22 • Tidal freshwater emergent wetland
- 23 • Valley/foothill riparian
- 24 • Nontidal perennial aquatic
- 25 • Nontidal freshwater perennial emergent wetland
- 26 • Nontidal brackish emergent wetland
- 27 • Alkaline seasonal wetland complex
- 28 • Vernal pool complex
- 29 • Other natural seasonal wetland
- 30 • Grassland

31 Six of the vegetation alliances mapped in the study area within the tidal brackish emergent wetland  
32 natural community are considered to have special status (Alkali Heath Alliance, American Bulrush  
33 Alliance, Creeping Wildrye Alliance, Gumplant Alliance, Pickleweed Alliance, Salt Marsh Bulrush  
34 Alliance).

35 Two plant alliances found in the tidal freshwater emergent wetland natural community in the study  
36 area are considered to have special status (American Bulrush Alliance, Santa Barbara Sedge  
37 Alliance).



1 Three special-status vegetation alliances are components of nontidal brackish emergent wetland  
2 (Alkali Heath Alliance, Pickleweed Alliance, Salt Marsh Bulrush Alliance).

3 Two special-status vegetation alliances in the study area are components of the nontidal freshwater  
4 perennial emergent wetland natural community (American Bulrush Alliance, Wildrye Alliance).

5 Three special-status plant alliances in the study area are components of alkaline seasonal wetland  
6 complex (Alkali Heath Alliance, Bush Seepweed Alliance, Iodine Bush Alliance).

7 Vernal pools and vernal pool grassland in the study area have not been mapped to the alliance level,  
8 but many vernal pool alliances expected to occur in the study area have special status, including  
9 alliances characterized by Fremont goldfields (*Lasthenia fremontii*), smooth goldfields (*Lasthenia*  
10 *glaberrima*), and common spikerush (*Eleocharis macrostachya*).

11 Grassland alliances in the study area also have not been mapped to the alliance level. However,  
12 special-status alliances that may occur within the grassland community in the study area include  
13 Gum plant patches, Creeping ryegrass turf, Needlegrass grassland, and Curly bluegrass grassland.

14 Two land cover types (agricultural and developed) present in the study area are not considered  
15 special-status natural communities. Though some cultivated lands and developed lands provide  
16 habitat for special-status species, as a natural community and a land cover type these areas are not  
17 of limited distribution and do not in themselves require particular regulatory consideration for the  
18 vegetation that occurs there (e.g., these areas are not regulated wetlands). Throughout the  
19 remainder of the chapter, these two community/land cover types are addressed in the context of the  
20 other natural communities.

### 21 **13.1.3 Special-Status Species**

22 This section addresses plant and wildlife species considered for analysis in the Draft EIR.

23 For the purposes of this Draft EIR, special-status species are legally protected or otherwise  
24 regulated or tracked by federal, state, or local resource agencies. Special-status species are species,  
25 subspecies, or varieties that fall into one or more of these categories.

- 26 • Listed as threatened or endangered under the federal Endangered Species Act (ESA).
- 27 • Proposed or candidates for listing under the ESA.
- 28 • Listed as threatened or endangered under the California Endangered Species Act (CESA).
- 29 • Plants listed as rare under the Native Plant Protection Act.
- 30 • Candidates for listing under the CESA.
- 31 • Taxa (i.e., taxonomic categories or groups) that meet the criteria for listing, even if not currently  
32 included on any list, as described in Section 15380 of the State CEQA Guidelines (e.g., species  
33 that appear on the CDFW special animals list).
- 34 • California species of special concern.
- 35 • California fully protected species.
- 36 • Plants ranked as “rare, threatened, or endangered in California” (California Rare Plant Rank  
37 [CRPR] 1B and 2).

- 1 • Plants that may warrant consideration on the basis of local significance or recent biological  
2 information (CEQA Guidelines § 15380(d)), which may include some CRPR 3 and 4 species  
3 (plants about which more information is needed to determine their status and plants of limited  
4 distribution, respectively).
- 5 • Plant species included on the CNDDDB *Special Plants, Bryophytes, and Lichens List* (California  
6 Department of Fish and Wildlife 2020b).
- 7 • Plants considered to be locally significant species, that is, species that are not rare from a  
8 statewide perspective but are rare or unique in a local context, such as within a county or region  
9 (CEQA Guidelines § 15125(c)) or are so designated in local or regional plans, policies, or  
10 ordinances (CEQA Guidelines, Appendix G).

### 11 **13.1.3.1 Critical Habitat**

12 Critical habitat refers to areas designated by USFWS for the conservation of species listed as  
13 threatened or endangered under the ESA. When a species is proposed for listing under the ESA,  
14 USFWS considers whether there are certain areas essential to the conservation of the species.

15 Critical habitat is defined in Section 3 of the ESA as follows.

- 16 1. The specific areas within the geographical area occupied by a species at the time it is listed in  
17 accordance with the act, on which are found those physical or biological features:
  - 18 a. essential to the conservation of the species, and
  - 19 b. that may require special management considerations or protection; and
- 20 2. Specific areas outside the geographical area occupied by a species at the time it is listed, upon a  
21 determination that such areas are essential for the conservation of the species.

22 Any federal action (permit, license, or funding) that has a potential to adversely modify critical  
23 habitat, requires that the federal agency consult with USFWS.

24 The federally listed wildlife and plant species that have designated critical habitat within the study  
25 area are presented in Table 13-2 below. Critical habitat for each species is presented in the figures in  
26 the respective species accounts in Appendix 13B, *Species Accounts*, and is also discussed in Section  
27 13.3.3, *Impacts and Mitigation Approaches*.

28 **Table 13-2. Designated Critical Habitat within the Study Area for Wildlife and Plant Species**

Species	Acres of Critical Habitat
Vernal pool fairy shrimp	338
Delta green ground beetle ( <i>Elaphrus viridis</i> )	319
California tiger salamander, Central California DPS ( <i>Ambystoma californiense</i> )	1,645
California red-legged frog	1,875
Contra Costa goldfields ( <i>Lasthenia conjugens</i> )	890

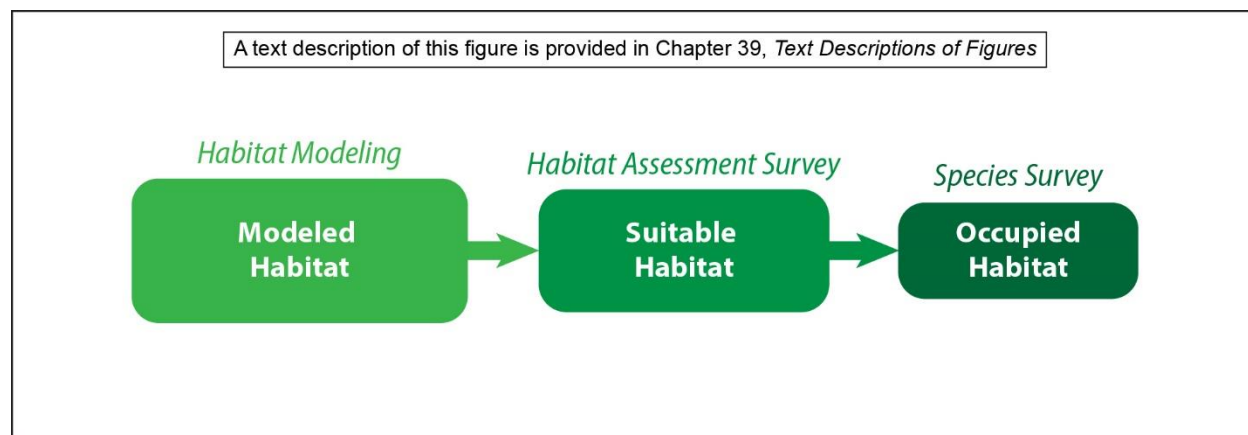
29 DPS = distinct population segment.

### 30 **13.1.3.2 Special-Status Plant Species**

31 A list of special-status plant species occurring in the study area was generated from a query of the  
32 CNDDDB based on the limits of the study area (California Department of Fish and Wildlife 2020a).  
33 Additional information about plant species occurring or potentially occurring in the study area was

1 obtained by a search of the California Native Plant Society (CNPS) Electronic Inventory for the U.S.  
 2 Geological Survey (USGS) map quadrangles that overlap with the limits of the study area (California  
 3 Native Plant Society 2020a–2020j). Table 13A-1 in Appendix 13A, *Special-Status Species with*  
 4 *Potential to Occur in the Study Area*, presents detailed information on the special-status plant species  
 5 known or with potential to occur in study area and includes their common and scientific names,  
 6 listing status (federal, state, and CNPS), notes on the species habitat, distribution in California,  
 7 flowering period, and potential for occurrence in the study area. Species in Appendix 13A, Table  
 8 13A-1 that are not known to occur in the study area and that would not be affected by the project  
 9 alternatives are not addressed further.

10 More detailed information on the plant species habitat requirements, distribution, and occurrences  
 11 within the study area is presented in the species accounts in Appendix 13B. The species accounts  
 12 also contain the habitat suitability models, which are GIS-based models used for establishing the  
 13 amount of potential habitat for a species within the study area, for estimating effects on the species,  
 14 and for identifying areas where avoidance and minimization measures would be implemented. Prior  
 15 to project construction, all work areas would be evaluated for the presence of suitable habitat  
 16 and/or the occupation by special-status plant species through on-the-ground habitat assessments  
 17 and/or species surveys (Figure 13-1). The methods used to develop these models are described in  
 18 Appendix 13B, Section 13B.0.1.5, *Species Habitat Suitability Methods*.  
 19



20  
 21 **Figure 13-1. Modeled Habitat in Relation to Suitable and Occupied Habitat**

### 22 **13.1.3.3 Special-Status Wildlife Species**

23 Table 13A-2 in Appendix 13A provides information on the special-status wildlife species that were  
 24 identified for consideration in the Draft EIR, including common and scientific names, listing status  
 25 (federal, state, global rank, and/or state rank), notes on the species life history, habitat, distribution  
 26 in California, and potential for occurrence in the study area. The species listed in this table were  
 27 generated from queries of the CNDDDB and the USFWS database based on the limits of the study area,  
 28 and by taking into consideration the ranges of special-status species that have a potential to occur in  
 29 the study area despite not having occurrences in the study area. The primary source of range  
 30 information for considering the inclusion of additional species were the maps and range  
 31 descriptions within the online version of the California Wildlife Habitat Relationship System  
 32 (California Department of Fish and Wildlife 2020c). Species in Appendix 13A, Table 13A-2 that are  
 33 not known to occur in the study area, have ranges outside the study area, lack suitable habitat in the  
 34 study area, and/or that would not be affected by the project alternatives are not addressed further.

1 More detailed information on the wildlife species habitat requirements, distribution, and  
2 occurrences within the study area is presented in the species accounts in Appendix 13B. The species  
3 accounts also contain the descriptions of the habitat suitability models, which are GIS-based models  
4 used for establishing the amount of potential habitat for a species within the study area, for  
5 estimating effects on the species, and for identifying areas where avoidance and minimization  
6 measures would be implemented. Prior to project construction, all work areas would be evaluated  
7 for the presence of suitable habitat and/or the occupation by special-status wildlife through on-the-  
8 ground habitat assessments and/or species surveys (Figure 13-1). The methods used to develop  
9 these models are described in Appendix 13B, Section 13B.0.1.5.

10 In addition to special-status species, non-special-status migratory birds and raptors that may be  
11 present in or adjacent to the project footprint and that are protected by California Fish and Game  
12 Code Sections 3503 and 3503.5 and the federal Migratory Bird Treaty Act were collectively included  
13 as part of the analysis.

### 14 **13.1.4 Wetlands and Other Waters of the United States**

15 *Waters of the United States* are aquatic resources that are subject to federal jurisdiction under the  
16 CWA. Waters of the United States are categorized as either wetlands or other waters. Each of these  
17 two categories is briefly described below and a more detailed discussion of waters of the United  
18 States under the CWA is included in Section 13.2, *Applicable Laws, Regulations, and Programs*.

19 In general, wetlands are characterized as having a dominance of hydrophytic vegetation, hydric  
20 soils, and wetland hydrology (a more detailed definition of wetlands is provided below).

21 Other waters of the United States are generally linear features (e.g., streams) and open-water  
22 habitats that can be tidal or nontidal.

23 As mentioned in Section 13.1.2.1, *Land Cover Mapping Methods*, DWR conducted an aquatic  
24 resources delineation within a subset of the study area, referred to as the *delineation study area*.  
25 Wetland features within the delineation study area were identified based on the *Corps of Engineers*  
26 *Wetlands Delineation Manual* (U.S. Army Corps of Engineers 1987) and *Regional Supplement to the*  
27 *Corps of Engineers Wetland Delineation Manual: Arid West Region* (U.S. Army Corps of Engineers  
28 2008), technical guidance documents that describe and define the characteristics of wetlands. In  
29 these guidance documents, wetlands are defined as areas that are inundated or saturated by surface  
30 water or groundwater at a frequency and duration sufficient to support, and that under normal  
31 circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil  
32 conditions (U.S. Army Corps of Engineers 2008:2).

33 The delineation study area encompasses approximately 143,485 acres of the study area, which  
34 includes areas where all potential alternative alignments and associated infrastructure would be  
35 situated. At the time of the delineation, a lack of access to properties under private ownership  
36 resulted in only a limited portion of the study area being accessible to conduct field delineation;  
37 therefore, the decision was made to conduct the entire delineation via aerial imagery interpretation  
38 in order to maintain consistency across the study area.

39 The aquatic resources delineation was conducted by DWR, GEI Consultants, Inc., and Stillwater  
40 Sciences, working under the direction of DWR's Delta Conveyance Office. The team used aerial  
41 imagery interpretation in GIS to identify and delineate aquatic features in the study area by  
42 identifying signatures typically associated with, and indicative of wetlands, including areas of

1 inundation or saturation on wet season imagery, hydrophytic vegetation signatures that persisted  
2 over multiple years, and soil map unit properties as obtained from the Natural Resources  
3 Conservation Service (NRCS) Soil Survey. Other imagery signatures that were evaluated included  
4 variation in soil color and areas of active agriculture where cropped lands showed reduced growth  
5 and/or vigor. Light detection and ranging (LiDAR) imagery was routinely used to identify minor  
6 variations in topography to correlate potential wetland signatures on aerial imagery to topographic  
7 depressions and to delineate wetland polygons.

8 Wetlands and other waters were mapped using the following as data sources.

- 9 ● 1-foot resolution true-color digital orthorectified aerial imagery flown on December 14–20,  
10 2017 (U.S. Geological Survey 2017)
- 11 ● 2017 Sacramento–San Joaquin Delta LiDAR, Digital Elevation Model data from flights conducted  
12 on December 9, 2017, through January 21, 2018 (U.S. Geological Survey 2017)
- 13 ● 1-meter pixel resolution true-color digital aerial imagery from the National Agriculture Imagery  
14 Program captured in 2018 (National Agriculture Imagery Program 2018)
- 15 ● Soil data from the NRCS Web Soil Survey database (Natural Resources Conservation Service  
16 2019)

17 Additional sources of information included historical aerial imagery available on Google Earth, USGS  
18 topographic maps, earlier National Agriculture Imagery Program imagery, the U.S. Fish and Wildlife  
19 Service’s (USFWS) National Wetland Inventory (U.S. Fish and Wildlife Service 2020a), and the 2011  
20 Delta Vegetation and Land Use Data (Chico State Research Foundation, Geographical Information  
21 Center 2019). Wetland mapping products that were developed by DWR for the Bay Delta  
22 Conservation Plan/California WaterFix were also consulted.

23 Aquatic resources were categorized as perennial or seasonal, based on persistence of hydrology as  
24 evidenced by sustained inundation or saturation visible on aerial imagery. Perennial wetlands were  
25 further classified into emergent wetlands, scrub-shrub wetlands, or forested wetlands based  
26 primarily on vegetative life form (i.e., herbaceous, shrub dominated, or tree dominated). Seasonal  
27 wetlands were further classified as alkaline wetland or vernal pool, as these habitats have unique  
28 soil and distinctive vegetation assemblages. The seasonal wetland category also includes a third  
29 class generalized as “seasonal wetland” to capture the diversity of non-specialized vegetation  
30 assemblages that are associated with a range of soil types and are subject to temporary inundation  
31 of a duration that supports a hydrophytic vegetation assemblage.

32 Linear features and open-water habitats that may qualify as other waters of the United States were  
33 categorized based on tidal influence as nontidal or tidal. Nontidal waters include natural channels,  
34 depressions, and agricultural ditches. Tidal classifications include tidal channel, which includes  
35 major waterways, and conveyance channel, which was used for conveyance features associated with  
36 the State Water Project (SWP) and Central Valley Project (CVP).

37 The initial aquatic resources delineation was verified and received a preliminary jurisdictional  
38 determination from USACE on June 18, 2020. The initial delineation was submitted to the State  
39 Water Board for their review and concurrence. The State Water Board concurred that the aquatic  
40 resources mapped by DWR would be considered to include all waters of the State. In late 2020 and  
41 in 2021, the study area was expanded to the east and west and additional aquatic resources  
42 mapping was completed. The results of this additional mapping have been submitted to USACE and  
43 the State Water Board. The results of the delineation are summarized below in Table 13-3 and these

1 aquatic resources within their respective natural communities are presented in Mapbooks 13-1, 13-  
2 2, and 13-3.

3 **Table 13-3. Area (in acres) of Jurisdictional Aquatic Features in the Delineation Study Area**

Wetlands and Other Waters	Delineation Study Area Total (acres)
<b>Wetlands</b>	
Emergent wetland	1,501
Scrub-shrub wetland	875
Forested wetland	566
Vernal pool	63
Seasonal wetland	2,260
Alkaline wetland	335
Wetlands Subtotal	5,600
<b>Other Waters</b>	
Agricultural ditch	2,382
Natural channel	14
Depression	514
Tidal channel	7,419
Conveyance channel	116
Other Wates Subtotal	10,445
Total	16,045

4

#### 5 **13.1.4.1 Perennial Wetlands**

6 Perennial wetlands are dominated by persistent hydrophytic vegetation. Three types of perennial  
7 wetlands were mapped in the delineation study area based on the growth form of the vegetation.

#### 8 **Emergent Wetland**

9 Emergent wetlands within the delineation study area are dominated by herbaceous emergent plants  
10 such as California tule, hard-stem tule, narrow-leaf cattail, broad-leaf cattail, and floating water  
11 primrose. The vegetation assemblages typically associated with this wetland type are almost  
12 exclusively dominated by species rated as obligate on the National Wetland Plant List (Lichvar et al.  
13 2016:8–17). These areas have a persistent vegetative aerial signature and evidence of inundation or  
14 saturation is present on most aerial images evaluated.

15 This wetland class typically occurs at the edges of ponds or lakes, along the margins of tidal  
16 channels, on in-channel islands of major tidal channels within the Delta, and where seepage occurs  
17 on the landside of levees.

#### 18 **Scrub-Shrub Wetlands**

19 Scrub-shrub wetlands within the delineation study area are dominated by woody vegetation less  
20 than 20 feet tall and include shrubs typically associated with riparian areas such as sandbar willow  
21 (*Salix exigua*), Himalayan blackberry, red twig dogwood (*Cornus sericea*), buttonwillow  
22 (*Cephalanthus occidentalis*), and California wild rose (*Rosa californica*). Fremont's cottonwood

1 seedlings or saplings may also be present. The vegetation assemblages typically associated with this  
2 wetland type include species rated as obligate, facultative wetland, and facultative on the National  
3 Wetland Plant List (Lichvar et al. 2016:8–17). Herbaceous species are generally lacking or are a  
4 minor component of the vegetation assemblage, as the canopy cover in scrub-shrub wetlands is high  
5 and low-growing herbaceous species do not receive sufficient light for survival. Evidence of  
6 saturation or inundation is more variable as compared to the emergent wetland class; however, the  
7 vegetation community is persistent due to the dominance of perennial shrubs.

8 The scrub-shrub wetland class typically occurs at the periphery of depressions, ponds, and lakes;  
9 along the margins of tidal and nontidal channels; and on in-channel islands in the Delta.

## 10 **Forested Wetlands**

11 Forested wetlands are defined by woody vegetation that is 20 feet tall or taller with a tree canopy  
12 cover equal to or greater than 25%. Riparian trees common in the delineation study area include  
13 Goodding's black willow (*Salix gooddingii*), red willow (*Salix laevigata*), box elder, Oregon ash,  
14 Fremont's cottonwood, white alder (*Alnus rhombifolia*), black walnut (*Juglans nigra*), and valley oak.  
15 Forested wetlands generally have a shrub component, typically in canopy openings and along the  
16 forested edge. The presence of an herbaceous layer is variable. The vegetation assemblages typically  
17 associated with forested wetlands include species rated as facultative wetland and facultative on the  
18 National Wetland Plant List (Lichvar et al. 2016:8–17). Species with obligate or facultative upland  
19 ratings are occasional in forested wetlands, and generally not the dominant species represented in  
20 the habitat.

21 Forested wetlands within the delineation study area are located along the edges of tidal and nontidal  
22 channels, and on in-channel islands located within tidally influenced waterways. Evidence of  
23 saturation or inundation is variable on aerial images as compared to the emergent wetland class;  
24 however, the vegetation community is persistent due to the dominance of perennial tree species.

### 25 **13.1.4.2 Seasonal Wetlands**

26 Three classes of seasonal wetlands were mapped in the delineation study area. Seasonal wetlands  
27 experience temporary inundation or saturation, typically in the winter or spring months of water  
28 years that receive normal or above normal precipitation. Inundation and saturation are most  
29 evident on aerial images captured during wet months. Due to the seasonality of saturated or  
30 inundated conditions, hydrophytic vegetation is transitory and these areas are prone to colonization  
31 by annual upland grasses and forbs late in the growing season as the soils dry. Aerial image  
32 evaluation in addition to the primary image source years of 2017 and 2018 was often necessary to  
33 aid in the determination of seasonal wetlands.

### 34 **Vernal Pool**

35 Vernal pool wetlands are topographic depressions that are usually found within annual grassland  
36 habitats. There is a water-restricting soil horizon, often high in clay content and indurated, located  
37 near the soil surface that prevents water from infiltrating deep into the soil horizons and away from  
38 the root zone. These depressions fill with rainwater and may remain inundated through spring or  
39 early summer. Vernal pools often occur in complexes of many small pools that are hydrologically  
40 interconnected via overland surface flow through swales when pools are full. Water may also move  
41 below the soil surface as water infiltrates and travels above the hardpan or claypan layer into  
42 adjacent pools. Vernal pools support distinct herbaceous vegetation assemblages and many of the

1 plant species that occur in this wetland type are endemic to California. Vernal pool wetlands can  
2 support a variety of floristic diversity, ranging from common to rare. Commonly encountered  
3 species typical of vernal pool habitats within the delineation study area include popcorn flowers  
4 (*Plagiobothrys* spp.), Fremont's tidy tips (*Layia fremontii*), goldfields (*Lasthenia* spp.), coyote-thistle  
5 (*Eryngium* spp.), calicoflower (*Downingia* spp.), and common spikerush (*Eleocharis macrostachya*).  
6 The wet phase of vernal pools is dominated by plants rated as obligate or facultative wetland on the  
7 National Wetland Plant List (Lichvar et al. 2016:8–17). As the vernal pools draw down as a result of  
8 evaporation and increased evapotranspiration in late spring and early summer, annual upland  
9 grasses sometimes colonize and become dominant in these seasonal wetland habitats.

10 Vernal pool wetlands within the delineation study area are located primarily in areas that are  
11 relatively undeveloped without substantial land alteration. This wetland type occurs on lands with  
12 hummocky surfaces, primarily at the northernmost portion of the delineation study area south of  
13 North Stone Lake, and along the western side of the San Joaquin Valley near Clifton Court Forebay.

## 14 Seasonal Wetland

15 Seasonal wetlands are the most broad and diverse of the wetland classes identified in this report.  
16 These wetlands are primarily colonized by herbaceous species that are common throughout the  
17 Central Valley and Delta. The vegetation assemblages typically associated with seasonal wetlands  
18 primarily include species rated as facultative wetland and facultative on the National Wetland Plant  
19 List (Lichvar et al. 2016:8–17), and often include ruderal species such as tall flatsedge (*Cyperus*  
20 *eragrostis*), Santa Barbara sedge (*Carex barbarae*), soft rush (*Juncus effusus*), fiddle dock (*Rumex*  
21 *pulcher*), curly dock, and perennial rye grass (*Festuca perennis*). Species with obligate or facultative  
22 upland ratings typically comprise a lesser percentage of the plant community. The vegetation  
23 composition is influenced primarily by landscape position, effects of groundwater, soil texture, and  
24 runoff and drainage properties, as well as anthropogenic and natural disturbances.

25 Seasonal wetlands are the most prevalent and widespread of all wetland classes mapped within the  
26 delineation study area. Evidence of saturation or inundation is variable on aerial images, especially  
27 in areas with a high degree of anthropogenic modification and which may be subject to regular  
28 disturbance such as agriculture or winter flooding for migratory bird and waterfowl management.  
29 Numerous seasonal wetlands were mapped in active agricultural fields in the Delta. While the size  
30 and shape of seasonal wetlands in farmed fields is subject to a degree of annual variation which may  
31 result from ongoing farming practices, some evidence of wet season inundation or saturation is  
32 visible in a typical year. Although groundwater levels are controlled on Delta islands using a system  
33 of pumps and drainage ditches to maintain water levels on the subsided islands, a high water table  
34 persists in some areas. Upland crops planted in these areas may be subject to failure or may be  
35 impossible to harvest; therefore, aerial signatures indicating reduced growth and/or vigor in crops  
36 such as corn or areas within cropped fields that were seldom planted were interpreted as  
37 indications of wetland conditions and these areas were categorized as seasonal wetland.

## 38 Alkaline Wetland

39 Alkaline wetland is a type of seasonal wetland influenced by strongly alkaline or saline soils.  
40 Alkaline wetlands often support alkaline or saline tolerant shrubs such as iodine bush, alkali heath,  
41 bush seepweed (*Suaeda nigra*), and saltbush. The shrub layer may be codominant with salt-tolerant  
42 grasses including salt grass and alkali sacaton (*Sporobolus airoides*). This wetland type may have  
43 large unvegetated areas as a result of salt accumulations at or near the soil surface. Alkaline wetland



1 habitats are dominated by an assemblage of plants with facultative wetland or facultative ratings on  
2 the National Wetland Plant List (Lichvar et al. 2016:8–17).

3 Evidence of seasonal saturation or inundation may be present on wet season aerial imagery, and salt  
4 crust presents bright white signatures during dry season imagery. Alkaline wetlands are primarily  
5 located in the southern portion of the delineation study area on lands without substantial land  
6 alteration, or in small patches at the periphery of agricultural fields or along canals.

### 7 **13.1.4.3 Nontidal Waters**

8 Three types of nontidal waters were mapped in the delineation study area. Nontidal features include  
9 naturally occurring features and anthropogenic features on the landscape that are the result of  
10 ditching or excavation. Nontidal waters are subject to Section 404 of the CWA up to the ordinary  
11 high water mark.

#### 12 **Agricultural Ditches**

13 Agricultural land cover is common throughout the delineation study area, most notably on Delta  
14 islands. Agricultural ditches are used for irrigation and drainage purposes. Agricultural ditches  
15 range in size from 1 to 75 feet in width. These features are generally unvegetated with  
16 unconsolidated mud bottoms as a result of regular maintenance activities conducted to maintain  
17 capacity for drainage and water delivery. Tule and cattail species may colonize ditch side-slopes if  
18 there is a lapse in the vegetation maintenance cycle. Water in agricultural ditches may be pumped  
19 off agricultural lands and/or Delta islands and have a connection to Traditional Navigable Waters  
20 (TNW) or Relatively Permanent Waters (RPW).

#### 21 **Natural Channels**

22 Nontidal natural channels are present primarily along the northeast and southwest portions of the  
23 delineation study area. Natural channels include intermittent streams that qualify as RPW and  
24 ephemeral channels that qualify as non-RPW. All features mapped to this class are assumed to have  
25 an OHWM as indicated by a change in vegetative character or break in bank slope, as evidenced on  
26 aerial imagery or the Digital Elevation Model. The substrate in natural channels may be mud, sand,  
27 gravel, and/or cobble depending on geographic location. Natural channels within the delineation  
28 study area include waterways such as drainages to Stone Lake and tributaries to the Cosumnes  
29 River and Italian Slough.

#### 30 **Depressions**

31 Depressions are open-water ponds that are permanently or seasonally inundated, with little to no  
32 rooted vegetation on an unconsolidated or mud bottom. These features may be artificially filled as a  
33 result of agricultural or stormwater detention or may result from a high water table. Depressions  
34 generally have a water depth of less than 6 feet. These waterbodies are often created by excavation  
35 and are diked or otherwise artificially impounded.

36 Depressions may be colonized by floating plant species such as common duckweed (*Lemna minor*),  
37 mosquito fern (*Azolla filiculoides*), or water hyacinth, but generally lack rooted vegetation except on  
38 depression margins.

#### 1 **13.1.4.4 Tidal Waters**

2 Tidal waters are the open-water portions of linear aquatic features that are influenced by the rise  
3 and fall of the tides. Human-made structures such as gates or culverts may restrict tidal influence to  
4 varying degrees. Tidal waters are subject to regulation under Section 404 of the CWA up to the mean  
5 higher high water elevation (e.g., high tide line), and are subject to Section 10 of the Rivers and  
6 Harbors Act of 1899 up to the mean high water level.

#### 7 **Tidal Channels**

8 Tidal channels are natural perennial riverine waterways, though most within the delineation study  
9 area have been modified with leveed banks that are reinforced with rock revetment. In-channel  
10 water velocity and depth fluctuate under tidal influence, and the channel bottom is generally  
11 composed of mud or unconsolidated sediments with varying amounts of sand, silt, and clay.

12 Emergent wetlands that occur along the margins of tidal channels and in-channel islands that are  
13 also commonly encountered in the delineation study area, notably along Old River and Middle River,  
14 were mapped separately from the tidal channel aquatic type.

#### 15 **Conveyance Channels**

16 Conveyance channels include rock or cement-lined linear channels. These are constructed water  
17 features that are associated with the SWP or CVP. These features are generally straight as a result of  
18 excavation and are diked or have reinforced banks. Vegetation is generally absent because of water  
19 depth or a lack of rooting substrate. Control structures are present that periodically affect tidal  
20 influence, but conveyance channels experience tidal fluctuation when water is brought into the  
21 system, generally on a flood tide.

#### 22 **13.1.4.5 Relationship to Waters of the State**

23 Under the Porter-Cologne Act, waters of the State include “any surface water or groundwater,  
24 including saline waters, within the boundaries of the state,” which is a broader definition than that  
25 of waters of the United States. Because DWR’s delineation did not exclude any such wetlands and  
26 waters, the delineation also potentially represents what would be considered waters of the State  
27 within the delineation study area.

### 28 **13.1.5 Invasive and Noxious Plant Species**

29 This section discusses the applications of the terms *invasive plants* and *noxious weeds*, defines  
30 invasive plants for the purposes of this chapter, provides general discussion on the effects of  
31 invasive plants on native species and natural communities, and identifies the invasive species that  
32 primarily affect the natural communities in the study area. The invasive species discussed below  
33 may affect more than one natural community. Information about the role of invasive plants as  
34 stressors to native fisheries is provided in Chapter 12, *Fish and Aquatic Resources*.

#### 35 **13.1.5.1 Definitions**

36 The study area contains both aquatic and terrestrial plant species that have been designated as  
37 invasive plants and/or noxious weeds. Although these two descriptive terms are sometimes used  
38 interchangeably, it is important to note that there are implications associated with the use of each

1 term. The term *noxious weed* is a designation used by government agencies, such as the U.S.  
2 Department of Agriculture (USDA) and the California Department of Food and Agriculture (CDFA),  
3 for plant species that have been identified as pests by law or regulation. Invasive plants may be  
4 considered as such from a scientific perspective because of their ability to spread to areas that are  
5 far from their point of introduction (Richardson et al. 2000:93). Plant species can also be identified  
6 as invasive through recognition by nongovernmental organizations, such as the California Invasive  
7 Plant Council, which maintains a list of invasive plants that threaten California's wildlands. For the  
8 purpose of this Draft EIR, *invasive plants* are species that have been identified as noxious weeds by  
9 USDA or CDFA, or as invasive plants by the California Invasive Plant Council (Cal-IPC) (California  
10 Invasive Plant Council 2006; California Department of Food and Agriculture 2021; U.S. Department  
11 of Agriculture 2019). The study area does not contain any known populations of noxious weeds  
12 identified by the USDA.

### 13 **13.1.5.2 General Effects on Native Species and Natural Communities**

14 According to the California Department of Fish and Game's *California Aquatic Invasive Species*  
15 *Management Plan*, invasive species threaten the diversity or abundance of native species through  
16 competition for resources, predation, parasitism, hybridization with native populations,  
17 introduction of pathogens, or physical or chemical alteration of the invaded habitat (California  
18 Department of Fish and Game 2008:ix). Invasive plants can change the invaded habitat by altering  
19 fire regimes, hydrology (e.g., sedimentation and erosion), light availability, nutrient cycling, and soil  
20 chemistry (California Invasive Plant Council 2006:1). Unlike the native plants they displace, many  
21 invasive plant species do not provide the food, shelter, or other habitat components on which many  
22 native fish and wildlife species depend. Invasive species also have the potential to harm human  
23 health and the economy by adversely affecting natural ecosystems, water delivery, flood protection  
24 systems, recreation, agricultural lands, and developed areas (California Department of Fish and  
25 Game 2008:ix, xi).

### 26 **13.1.5.3 Invasive Plant Species in Natural Communities**

27 The six counties that overlap with the study area contain 242 plant species that have been identified  
28 as invasive by Cal-IPC (Calflora 2021). Invasive species are present in all of the natural communities  
29 in the study area. Activities that promote the spread of invasive plants could have an adverse effect  
30 on natural communities in the study area. A discussion of the invasive species that primarily affect  
31 each natural community is provided below.

#### 32 **Tidal Perennial Aquatic**

33 Invasive plants have exhibited a pronounced negative effect on the tidal perennial aquatic natural  
34 community and the special-status species that inhabit it. Water hyacinth, Brazilian waterweed,  
35 South American spongeplant (*Limnobium spongia*), and alligator weed are invasive plant species of  
36 concern in this natural community. Additional information about the role of aquatic invasive plants  
37 as stressors to native fisheries is provided in Chapter 12, *Fish and Aquatic Resources*.

#### 38 **Tidal Brackish Emergent Wetland**

39 Invasive plants have exerted detrimental effects on the tidal brackish emergent wetland and the  
40 special-status species that occur there. Invasive plant species of concern in this natural community

1 are perennial pepperweed (*Lepidium latifolium*), fennel, giant reed (*Arundo donax*), pampas grass,  
2 barb goatgrass (*Aegilops triuncialis*) and rabbits-foot grass.

### 3 **Tidal Freshwater Emergent Wetland**

4 The primary invasive plants that affect the tidal freshwater emergent wetland natural community  
5 are perennial pepperweed and giant reed.

### 6 **Valley/Foothill Riparian**

7 In the study area, the primary invasive species that can negatively affect the valley/foothill riparian  
8 natural community are Himalayan blackberry, giant reed, perennial pepperweed, and red sesbania  
9 (*Sesbania punicea*). Perennial pepperweed can spread rapidly in riparian floodplain areas (Hogle et  
10 al. 2006:8). Other invasive species that occur in this natural community are black locust (*Robinia*  
11 *pseudoacacia*), and tamarisk (*Tamarix* spp.).

### 12 **Nontidal Perennial Aquatic**

13 The primary invasive plants in the nontidal perennial aquatic natural community are Brazilian  
14 waterweed (discussed above), Eurasian watermilfoil (*Myriophyllum spicatum*), and water hyacinth.

### 15 **Nontidal Freshwater Perennial Emergent Wetland**

16 The primary invasive plants that affect the nontidal freshwater perennial emergent wetland natural  
17 community are Brazilian waterweed, Eurasian watermilfoil, and water hyacinth.

### 18 **Nontidal Brackish Emergent Wetlands**

19 Invasive plants that could affect the nontidal brackish emergent wetland community are perennial  
20 peppergrass, five-horn Bassia (*Bassia hyssopifolia*), common brassbuttons (*Cotula coronopifolia*),  
21 kochia (*Kochia scoparia*), and annual rabbit's-foot grass. Perennial peppergrass could have a severe  
22 impact on this community.

### 23 **Alkaline Seasonal Wetland Complex**

24 The primary invasive plants that affect or could affect the alkaline seasonal wetland complex natural  
25 community in the study area are Italian ryegrass, perennial pepperweed, and Russian thistle.

### 26 **Vernal Pool Complex**

27 The invasive plants in the vernal pool complex invade the pool interiors or the adjacent grasslands.

28 Waxy mannagrass (*Glyceria declinata*) is a primary invasive plant in pool interiors.

29 Other invaders in grasslands that can have a substantial known or potential effect on vernal pools  
30 are perennial pepperweed, yellow star-thistle, medusahead (*Elymus caput-medusae*), purple  
31 starthistle (*Centaurea calcitrapa*), barb goatgrass, Italian ryegrass, and Italian thistle (Swiecki and  
32 Bernhardt 2002:34; Witham 2003:18, 2006:41-46; Hopkinson et al. 2008:20-24).

## 1        **Other Seasonal Wetlands**

2        The invasive species that primarily affect the other seasonal wetland community are waxy  
3        mannagrass, Italian ryegrass, and perennial pepperweed.

## 4        **Grassland**

5        The primary invasive species that affect the grassland natural community in the study area are  
6        comparable to those that occur in vernal pool complexes (discussed above).

## 7        **Agricultural**

8        Agricultural lands in the study area consist primarily of crops that are intermixed with small areas  
9        of natural habitat, such as riparian corridors or wetlands. Past and ongoing ground disturbance (e.g.,  
10        tillage and irrigation) associated with cultivated lands facilitate the establishment of invasive plants,  
11        which colonize the perimeter of active agricultural fields and rapidly germinate in fallow fields.  
12        Maintenance activities, such as herbicide application and regular cultivation, are implemented in  
13        active fields to reduce the effects of invasive plants. Invasive plants that are commonly found in  
14        cultivated lands are wild radish, bindweed, fennel, field mustard (*Brassica rapa*), and Bermuda  
15        grass.

## 16       **13.1.6        Wildlife and Habitat Connectivity**

### 17       **13.1.6.1        Connectivity Setting Overview**

18        The following sections provide an overview of general habitat and context with respect to wildlife  
19        connectivity with the study area and at a larger landscape scale surrounding the study area (i.e.,  
20        regional study area). The regional study area is defined as 25-mile area surrounding the study area.

### 21       **13.1.6.2        Existing Corridors and Linkages**

22        This section summarizes studies and data relevant to existing terrestrial wildlife connectivity  
23        resources including landscape/habitat blocks, corridors, linkages, and riparian corridors that have  
24        been documented in the study area via the project literature review and the CDFW BIOS Habitat  
25        Connectivity Viewer (California Department of Fish and Wildlife 2022). See Section 13.3.1.2,  
26        *Evaluation of Construction Activities*, under *Methods Used to Assess Impacts on Terrestrial Wildlife*  
27        *Connectivity*, for a description of the methods and data used in the evaluation and impacts analysis,  
28        and Appendix 13E, *Terrestrial Wildlife Connectivity*, for figures illustrating these data.

### 29       **Bay Area and Beyond Critical Linkages**

30        The Critical Linkages: Bay Area and Beyond effort (Penrod et al. 2013) was led by Science and  
31        Collaboration for Connected Wildlands, a nonprofit focused on connectivity conservation in a  
32        portion of the regional study area. The Critical Linkages: Bay Area and Beyond report identifies  
33        landscape-level connections that, combined with the Conservation Lands Network, create a  
34        comprehensive plan for regional-scale connectivity. The linkages identified are considered crucial to  
35        the region's ecological health. The study uses least-cost corridor analysis to identify movement  
36        routes between large landscape blocks for a number of focal species. The analysis modeled efficient  
37        paths based on weighted characteristics for each focal species. In total, 11 focal species were chosen  
38        for least-cost corridor linkage modeling. Linkages were designed on the basis of habitat suitability,

1 patch size, and patch configuration analysis, as well as opinion of species experts. These linkage  
2 designs were then field checked for barriers and areas of priority. The report offers a method for  
3 designing a conservation strategy and identifying opportunities for conserving linkages. No linkages  
4 identified by Penrod et al. (2013) overlap with the study area; however, the most eastern edge of the  
5 Mt. Diablo large landscape block, overlaps with the western boundary of the study area at Marsh  
6 Creek in the City of Brentwood. The Mount Diablo-Diablo Range Corridor, connecting Mount Diablo  
7 to the Diablo Range, is located immediately southwest of the study area (Figure 13E-1).

## 8 **California Essential Habitat Connectivity Project Data**

9 The California Essential Habitat Connectivity (CEHC) Project: A Strategy for Conserving a Connected  
10 California was designed to support land use planning and transportation. The report was produced  
11 by a multidisciplinary team of representatives of 62 agencies, a smaller technical advisory team, and  
12 a steering committee. The report includes a statewide Essential Habitat Connectivity Map, the data  
13 collected to delineate the areas shown on the map, recommendations for correcting the  
14 fragmentation caused by roads, and guidance for developing and implementing local and regional  
15 connectivity plans. Analysis was conducted to determine where mitigation would be most effective  
16 and how best to enhance connectivity while lessening vehicle-wildlife collisions (Spencer et al.  
17 2010).

18 The connectivity map depicts large natural blocks of habitat and areas deemed essential for  
19 ecological connectivity for a broad range of species. The Essential Connectivity Areas were found  
20 using least-cost path modeling; they are currently large polygons that need to be replaced by more  
21 refined linkage designs. The Natural Landscape Blocks and Essential Connectivity Areas can be used  
22 to help prioritize conservation, mitigation, and other land-based decisions (Spencer et al. 2010:xiii).  
23 The detailed linkage designs use the coarse Essential Connectivity Areas to refine and delineate  
24 specific lands needed to maintain or restore functional connections between Natural Landscape  
25 Blocks and to develop a course of action necessary for conservation. The detailed plan looks more  
26 closely at the areas to be connected and the focal species in those areas. Based on these two aspects,  
27 a least-cost path model can be run that takes into account the likelihood of future alterations such as  
28 climate change. The design can then be field verified for other opportunities and modified to add  
29 habitat where needed to improve corridor quality—for example, increasing width to 2 kilometers to  
30 accommodate medium animals and less mobile populations that take longer to disperse.

31 The study area is within the Great Central Valley Ecoregion, which is comprised of the Sacramento  
32 Valley in the north, the San Joaquin Valley in the south, and the Sacramento–San Joaquin Delta in  
33 between. The Great Central Valley is largely converted to agricultural and urban land covers, with  
34 severely reduced remaining natural communities resulting in the highest level of habitat conversion  
35 and fragmentation of any ecoregion (Spencer et al. 2010:52). Nevertheless, the Great Central Valley  
36 supports diverse native and endemic species especially in wetland areas and along waterways. As a  
37 whole, this ecoregion has 114 Natural Landscape Blocks entirely within the ecoregion that tend to  
38 be small and isolated; the largest Natural Landscape Blocks (those >20,000 acres) are largely  
39 restricted to the foothill margins of the Valley proper (Figure 13E-2). Ten Natural Landscape Blocks  
40 are within the study area; the named landscape blocks include Sacramento Bypass, Yolo Bypass,  
41 Little Holland Tract/Yolo Bypass, Stone Lake, Bear Slough, Staten Island, Montezuma Hills,  
42 Mandeville Island, Grizzley Island, and Brushy Peak. Three of the Natural Landscape Blocks (Yolo  
43 Bypass, Holland Tract/Yolo Bypass, and Mandeville Island) are entirely within the study area  
44 (Figure 13E-2). Scattered throughout the study area are numerous unnamed small natural areas  
45 (areas smaller than 2,000 acres that otherwise meet Natural Landscape Block criteria). Four

1 essential connectivity areas occur within the study area that connect at least two or more Natural  
2 Landscape Blocks: including the Yolo Bypass-Sacramento Bypass, Little Holland Tract/ Yolo Bypass-  
3 Yolo Bypass, Stone Lake–Yolo Bypass, Bear Slough–Browns Creek, Mandeville Island–Staten Island,  
4 and Mountain House–Brushy Peak (Figure 13E-2).

5 A major challenge of this ecoregion is to maintain and enhance local and regional connectivity across  
6 numerous roads, agricultural areas, and urban land covers. This challenge is being addressed by  
7 multiple agencies, researchers, and through local and regional connectivity planning and  
8 implementation. Many of these local and regional connectivity planning efforts emphasize  
9 restoration of aquatic flows and riparian forest, removing in-stream barriers, and increasing the  
10 extent and continuity of riparian vegetation communities along major rivers and tributaries.  
11 Additionally, various natural community conservation plans (NCCP) have focused on approaches for  
12 sustaining, restoring, and enhancing functional connectivity for diverse species and natural  
13 communities.

#### 14 **Potential Riparian Connections—CEHC**

15 The potential riparian connections dataset is a product of CEHC Project; the dataset illustrates the  
16 contribution of streams and rivers in providing additional avenues for terrestrial and aquatic  
17 connectivity in the network of Natural Landscape Blocks and Essential Connectivity Areas. Streams  
18 and rivers that intersect with the study area include Cosumnes River, Mokelumne River, Sacramento  
19 River, Putah Creek, San Joaquin River, Calaveras River, and French Camp Slough.

#### 20 **Terrestrial Connectivity Areas of Conservation Emphasis**

21 CDFW's Terrestrial Connectivity dataset within Areas of Conservation Emphasis summarizes  
22 information on terrestrial connectivity per hexagon and includes the presence of mapped corridors  
23 or linkages; the juxtaposition to large, contiguous, natural areas; and the relative intactness score.  
24 This dataset was developed to support conservation planning efforts by allowing users to spatially  
25 evaluate the relative contribution of an area to terrestrial connectivity based on the results of  
26 statewide, regional, and other connectivity analyses (California Department of Fish and Wildlife  
27 2017, 2019a). Each hexagonal mapping unit has a connectivity rank value from 1 to 5, with 5  
28 indicating areas of irreplaceable and essential connectivity conservation priority. Figure 13E-3  
29 shows the intersection between the Terrestrial Connectivity dataset and the study area. The  
30 majority of the study area intersects with hexagonal mapping units with a connectivity ranking of 1,  
31 signifying "limited connectivity opportunity," defined as "areas where land use may limit options for  
32 providing connectivity (e.g., agriculture, urban) or no connectivity importance has been identified in  
33 models (California Department of Fish and Wildlife 2019a). ACE terrestrial connectivity dataset  
34 generally identifies the majority of the study area that is not within the vicinity of a waterway as  
35 having limited terrestrial connectivity opportunities (Rank 1) (Figure 13E-3). Portions of the study  
36 area intersect with hexagonal mapping units with a connectivity ranking of 4 or 5, signifying  
37 "conservation planning linkages" and "irreplaceable and essential corridors," which are defined as  
38 "habitat connectivity linkages mapped in the CEHC and fine-scale regional connectivity studies" and  
39 "... channelized areas, as identified in The Nature Conservancy's Omniscape model, and priority  
40 species movement corridors" (California Department of Fish and Wildlife 2019a). Terrestrial  
41 connectivity improves around the Sacramento and San Joaquin Rivers and their associated  
42 tributaries, and around Liberty Island, Old River, Middle River, Grant Line Canal, and areas near and  
43 west of Byron Highway; these areas are identified as conservation planning linkages (Rank 4) or  
44 areas with implementation flexibility (Rank 3) because of the presence of nearby large, contiguous

1 natural areas and wildlife movement corridors. Areas identified with a connectivity ranking of 5  
2 include the Cosumnes River Preserve, northern portion of Liberty Island, Stones Lake National  
3 Wildlife Refuge, Little Holland Tract, San Joaquin River at Venice Island, Quimby Island, Little  
4 Mandeville Island, Kimball Island, and the remaining wetlands in the vicinity of Antioch Point.

## 5 **Missing Linkages in California's Landscape**

6 In 2000, a statewide interagency workshop was held to discuss and map critical and at-risk linkages  
7 throughout California. The effort, which included more than 200 contributing land managers,  
8 conservationists, and biologists, culminated in the *Missing Linkages: Restoring Connectivity to the*  
9 *California Landscape* report and linkage dataset (Penrod et al. 2001a, 2001b). The associated GIS  
10 data includes the 232 habitat linkages across California identified as a result of the *Missing Linkages:*  
11 *Restoring Connectivity to the California Landscape* report. Figure 13E-4 shows the intersection  
12 between the missing linkages dataset and the study area. The following linkages (from north to  
13 south) are within or near the study area.

- 14 • **Putah Creek**—From Lake Berryessa this riparian stream corridor extends approximately 29  
15 miles east to the Sacramento Deep Water Ship Channel, where it ultimately enters the  
16 Sacramento River. This landscape linkage was mapped along the South Fork of Putah Creek and  
17 was identified as a riparian stream corridor that provides movement habitat for the following  
18 key species groups (i.e., species used as connectivity indicators): fish (Chinook salmon  
19 [*Oncorhynchus tshawytscha*]), and birds. The linkage was ranked as having a priority value of 4  
20 (out of 5) for the feasibility of the linkage as a conservation priority. It was ranked as having a  
21 threat value of 5 (out of 5), indicating severe threat/loss imminent, for overall degree of threat  
22 to connectivity. The linkage was also identified as having local support opportunities for  
23 conservation planning and is a part of the UC Davis Putah Creek Riparian Reserve (University of  
24 California, Davis 2020), USACE, Teichert Aggregates, Yolo and Solano counties Resource  
25 Conservation District, and the Putah Creek council.
- 26 • **North South Cross Delta**—Extends from northeast of Dixon south through the Montezuma  
27 Hills, across Sherman Island, southeast through Brentwood to Coney Island. The landscape  
28 linkage was identified as oak and cottonwood riparian corridor and freshwater marsh habitat  
29 that provides movement habitat for migratory birds, bats, and aquatic and semi-aquatic  
30 vertebrates. The linkage was ranked as having a priority value of 4 (out of 5) for the feasibility of  
31 the linkage as a conservation priority. It was ranked as having a threat value of 3.5 (out of 5),  
32 indicating moderate threat, for overall degree of threat to connectivity. The linkage was  
33 identified as having many land parcels that are resource agency (i.e., USACE, CDFW, etc.) owned,  
34 which may facilitate conservation planning opportunities.
- 35 • **Grizzly-Cache Slough**—Extends from west of Lindsey Slough westward through Bradmoor  
36 Island to Grizzly Island. The most eastern extent of this landscape linkage is within the western  
37 boundary of the study area, near Rio Vista. This linkage was identified as a salt marsh, grassland,  
38 and vernal pool habitat and that provides movement habitat for the following key species: tule  
39 elk, fairy shrimp, delta smelt (*Hypomesus transpacificus*), black rail, and salt marsh harvest  
40 mouse. The linkage was ranked as having a moderate priority value of 3 (out of 5) for the  
41 feasibility of the linkage as a conservation priority. It was ranked as having a threat value of 2  
42 (out of 5), indicating low threat for overall degree of threat to connectivity. The linkage was also  
43 identified as having local support opportunities for conservation planning from The Nature  
44 Conservancy, Solano County Farmland and Open Space Trust, as well as private conservation  
45 easements and fee titles.



- 1       • **Suisun-San Pablo Bay**—Extend from Sherman Island west to western Suisun Bay, this linkage  
2 is identified as a potential connectivity ‘choke-point’. This linkage was identified as open water,  
3 tidal marsh, and brackish wetland movement habitat for the following key species: California  
4 Ridgway’s rail, salt marsh harvest mouse, and other marsh dependent wildlife species. The  
5 linkage was ranked as having a moderate priority value of 3 (out of 5) for the feasibility of the  
6 linkage as a conservation priority. It was ranked as having a threat value of 4.5 (out of 5),  
7 indicating somewhat severe threat/loss imminent, for overall degree of threat to connectivity.  
8 The linkage was also identified as having conservation opportunities through oil refinery  
9 rehabilitations or changes.
- 10       • **Lower San Joaquin River**—From Tulloch Reservoir, following the Stanislaus River west to the  
11 confluence of the Stanislaus and San Joaquin River, this riparian river corridor was identified as  
12 a ‘missing link’ and provides movement habitat for riparian brush rabbit, riparian woodrat  
13 (*Neotoma fuscipes riparia*), western yellow-billed cuckoo and other neotropical migratory birds,  
14 and ringtail (*Bassariscus astutus*). The linkage was ranked as having a priority value of 5 (out of  
15 5) for the feasibility of the linkage as a conservation priority. It was ranked as having a threat  
16 value of 4 (out of 5), indicating somewhat severe threat/loss imminent, for overall degree of  
17 threat to connectivity. The linkage was also identified as having conservation opportunities  
18 through collaborations between the Tuolumne River Trust, potential agency land acquisition  
19 through CALFED and USFWS, and is included in the USFWS Recovery Plan for Upland Species of  
20 the San Joaquin Valley (Penrod et al. 2021a:389-390).

## 21       **UC Davis Core Reserves and Corridors**

22       UC Davis ecologists compared conservation networks at regional and local scales from the same  
23 area within the Central Valley of California to analyze the impact of scale effects on conservation  
24 planning. An intersection of results from multiple scales could potentially be used to prioritize areas  
25 for conservation found to be important at several spatial scales. Using MARXAN and least corridor  
26 analysis technologies, potential regional and intraregional conservation networks were compared.  
27 The study found large differences, specifically in the disparateness of the identified corridors that  
28 connect core reserves, suggesting many regionally important corridors are not identified at the local  
29 scale and corridors connecting locally important core areas can be missed if only regional scale is  
30 taken into account in the planning process. One-third of the area identified for inclusion within a  
31 conservation network at either scale was identified at both the regional and local scale (Huber  
32 2008:79). The results suggest that planning efforts at any one scale neglects to include biodiversity  
33 patterns and ecological processes that are important at other scales (Huber et al. 2010:683).

34       Four core reserves were identified in the study area; two core reserves are located in the northern  
35 portion of the study area, one core reserve overlaps with the central portion of the study area (from  
36 Frank’s Tract northwest to the Sacramento River), and another core reserve overlaps with the most  
37 southeastern extent of the study area. Corridors have been identified linking the core reserves  
38 (Figure 13E-5).

## 39       **Wildlife Corridors—San Joaquin Valley**

40       The California Departments of Fish and Wildlife, Parks and Recreation, and Transportation  
41 (Caltrans) are collaborating to improve planning information for wildlife connectivity statewide. The  
42 results of an inquiry to identify existing information on wildlife corridors in California produced  
43 eight datasets covering three parts of California and a single statewide dataset. Not all datasets

1 represent the same data gathering and analysis criteria for designating corridors. The following  
2 datasets identified potential corridors connecting conservation opportunity areas in the San Joaquin  
3 Valley region: Statewide Corridors dataset by South Coast Wildlands; Central California Coast  
4 Corridors dataset by University of California, Davis; San Joaquin Valley Corridors dataset by  
5 Endangered Species Recovery Program; San Joaquin Valley Corridors (three datasets) by  
6 Information Center for the Environment; Southern California Corridors (two datasets), by South  
7 Coast Wildlands; and one dataset by Patrick Huber at the Information Center for the Environment,  
8 University of California, Davis.

9 These potential corridors were identified using a tool called Corridor Creator that is a modified  
10 version of the least-cost corridor ArcMap tool. This tool identifies a connectivity surface rather than  
11 single line, then the highest rated raster cells were selected from the resulting surfaces and  
12 converted them to polygons. For this analysis a more complex model was used to create the cost  
13 surface and included current land cover and management, road density, urban area density, natural  
14 area density, and waterway density. Cost surfaces for three broad suites of species were created:  
15 forest, open/shrub, and aquatic/riparian. These three surfaces were then summed to create one  
16 overall, generic cost surface for the region.

17 Six wildlife corridors intersect with the study area (Figure 13E-6). The Delta Old North corridor is  
18 located northwest of Bacon Island. The Delta-Mokelumne corridor is south of Thornton, Delta Old  
19 South is on Roberts Island east of Middle River, and three corridors are located south of Union  
20 Island. Old Lower San Joaquin corridor is southeast of Union Island and west of Lathrop; Coral  
21 Lower San Joaquin corridor is southeast of Tracy, and Old Coral corridor is southwest of Mountain  
22 House.

### 23 **Wildlife Movement Barrier Priorities**

24 The California Wildlife Barriers 2020 dataset and report (California Department of Fish and Wildlife  
25 2020d) represents CDFW's initial effort to identify priority wildlife movement barriers across the  
26 state. Increasing attention is being directed toward wildlife habitat connectivity as a mechanism of  
27 maintaining biodiversity in the face of population growth and climate change. Listing priority  
28 wildlife barrier locations will help focus limited financial resources where the highest need has been  
29 identified to improve wildlife movement. CDFW staff across the six administrative CDFW regions  
30 used all available empirical information, including existing connectivity and road crossing studies,  
31 collared-animal movement data, roadkill observations, and professional expertise, to identify linear  
32 segments of infrastructure that present barriers to terrestrial wildlife movement. The wildlife  
33 barriers were evaluated based on ten criteria and each CDFW region identified ten high priority  
34 locations for remediation. As a result, a total of 61 individual segments were identified as priorities  
35 statewide. Of the top priorities, 58 involve the State Highway System (e.g., interstate, highway or  
36 state route). One road, one railway, and one canal location were also identified, collectively  
37 representing a total of 610 linear miles.

38 Within the study area, a culvert on State Route (SR) 12 (ID W031) is identified as a wildlife  
39 movement barrier for giant garter snake, western pond turtle, mink (*Neovison vison*), river otter,  
40 beaver, and all other reptiles and mammals in the area (Figure 13E-7).

### 41 **Wildlife-Vehicle Collisions**

42 Wildlife-vehicle collision data (i.e., roadkill data) can be an important tool in assessing wildlife  
43 movement and potential barriers to movement. Roadkill data can be useful in identifying areas

1 where movement is constrained and where roadkill hotspots may be occurring. Roadkill data are  
2 not always indicative of preferred crossing locations because of the wide variety of factors that may  
3 contribute to roadkill: landscape factors, traffic volume, physical conditions, and availability and  
4 condition of potential crossing structures (e.g., culverts, undercrossing). Nevertheless, roadkill data  
5 can provide insight into where movement and mortality are occurring, prompting further  
6 investigation into potential causes and deployment of measures to reduce the incidence of roadkill.

7 The roadkill data utilized in this analysis were collected from the following sources:

- 8 • Opportunistically collected roadkill data gathered by volunteers for the University of California,  
9 Davis, California Roadkill Observation System (University of California, Davis 2021)
- 10 • Roadkill data from law enforcement vehicular accident and roadway hazard reports (Road  
11 Ecology Center 2021)

12 Roadkill data are predominantly gathered along I-5 in the Central Valley region, coinciding with  
13 highly developed areas, areas of high road density, and roads with high traffic volumes. Wildlife-  
14 vehicle collision data are also clustered along SR 4, 12, 160, and various local roads in the study area.

15 There were a total of 483 individual roadkill observations within the study area comprising  
16 approximately 71 species represented in these data. Species in the data include various bird species,  
17 amphibians, reptiles, small mammals such as ground squirrels and rabbits, medium-sized mammals  
18 such as raccoon, coyote, Northern river otter, and beaver, and large mammals including black-tailed  
19 deer. Within the study area three special-status species were observed in the roadkill data including  
20 American badger (*Taxidea taxus*), burrowing owl, and western pond turtle.

21 Figure 13E-8 in Appendix 13E illustrates the roadkill data for focal species within the study area and  
22 Table 13E-1 in Appendix 13E details the species represented in the roadkill data within the study  
23 area.

### 24 **13.1.6.3 Existing Infrastructure**

#### 25 **Existing Infrastructure Conditions**

26 Throughout the study area, various types of infrastructure present substantial constraints and  
27 barriers to wildlife movement. This section discusses roads and highways, rail lines, aqueducts and  
28 canals, and urban/developed lands.

#### 29 **Roads and Highways**

30 Local roads and highways are abundant throughout the study area. Multilane interstates and  
31 highways in the study area include I-80, I-5, I-205, SR 50, SR 160, SR 12, and SR 4. The highest road  
32 densities are in the West Sacramento, Stockton, Lathrop, Tracy, Brentwood, Oakley, Antioch, and  
33 Pittsburg areas. Many of these roads and highways, particularly those with high traffic volumes and  
34 in areas with high road density, present barriers to movement for a variety of species.

#### 35 **Rail**

36 Several existing rail lines cross the study area; these include railroads owned and operated by  
37 various entities such as Amtrak, Union Pacific Railroad, BNSF Railway, California Northern Railroad,  
38 Sierra Northern Railway, and Sacramento–Yolo Port District. Major rail alignments pass through the  
39 West Sacramento, Antioch, Tracy, and Stockton portions of the study area. Many of these rail lines

1 are not fenced and present a barrier and mortality risk to various species; some species likely avoid  
2 the rail lines, while others are at risk of train strike or entrapment in the rail track ballast.

### 3 **Aqueduct and Canals**

4 An extensive network of canals and aqueducts are located in the study area including the  
5 Sacramento Deep Water Ship Channel, Yolo Bypass, West Canal, Victoria Canal, Grant Line Canal,  
6 Delta-Mendota Canal, and the California Aqueduct. Many of these features are highly developed and  
7 channelized, presenting substantial barriers to wildlife movement. Animals can also become trapped  
8 in the canals and drown.

### 9 **Developed**

10 Developed and urbanized lands are distributed throughout the study area with highest densities in  
11 the West Sacramento, Stockton, Tracy, Brentwood, Oakley, Antioch, and Pittsburg portions. Because  
12 many species of wildlife (e.g., mountain lion [*Puma concolor*], mule deer [*Odocoileus hemionus*],  
13 badger) avoid developed and urbanized areas, these areas may act as barriers to wildlife movement  
14 and as important agents of habitat fragmentation.

## 15 **13.1.7 Habitat Conservation Plans**

### 16 **13.1.7.1 Habitat Conservation Plans Setting Overview**

17 The following section provides an overview of the three approved habitat conservation plans (HCPs)  
18 and one conservation strategy that overlap with the study area. See Section 13.3.1.2, *Evaluation of*  
19 *Construction Activities*, under *Methods Used to Assess Impacts on Conservation Plans*, for a description  
20 of the methods and data used in the evaluation and impacts analysis of the project on approved  
21 conservation plans.

### 22 **South Sacramento Habitat Conservation Plan**

23 The South Sacramento Habitat Conservation Plan (SSHCP) was permitted in 2019 and addresses  
24 issues related to species conservation, agricultural protection, and urban development in south  
25 Sacramento County. The plan is administered by Sacramento County; the cities of Sacramento, Elk  
26 Grove, Galt, and Rancho Cordova; Sacramento Regional County Sanitation District; and the Capital  
27 Southeast Connector Joint Powers Authority. The SSHCP covers 28 species of plants and wildlife,  
28 including 11 that are state- or federally listed as threatened or endangered.

29 The western extent of the SSHCP plan area overlaps the study area in Preserve Planning Unit (PPU)  
30 6. Included in the overlap is a portion of the SSHCP's Urban Development Area. PPU 6 encompasses  
31 95,196 acres, including 58,458 acres of agriculture, and 17,633 acres of grassland (County of  
32 Sacramento et al. 2018:7-90). The SSHCP intends to conserve at least 41,923 acres, most of which  
33 would be agricultural and grassland land cover types with limited overlap with the study area;  
34 within PPU 6, the SSHCP aims to conserve 9,750 acres, composed primarily of 8,465 acres of  
35 cropland and irrigated pasture, 623 acres of valley grassland, and 447 acres of riparian. The  
36 remaining 215 acres to be preserved within PPU 6 include wetland and open-water habitats (County  
37 of Sacramento et al. 2018:7-87-7-88, Table 7-6). Approximately 28,000 acres of existing cropland  
38 preserves are found within PPU 6 (County of Sacramento et al. 2018:3-167, Figure 3-38).

## 1 San Joaquin County Multi-Species Habitat Conservation and Open Space Plan

2 The San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJC MSHCP) was  
3 permitted in 2000 and is administered by the San Joaquin Council of Governments. This 50-year  
4 plan addresses 97 special-status plant, fish, and wildlife species (47 of which are on the federal  
5 permit) throughout most of San Joaquin County (more than 900,000 acres), including a substantial  
6 portion of the eastern Delta. The plan participants include the County of San Joaquin and the Cities  
7 of Stockton, Lodi, Manteca, Tracy, Ripon, Escalon, and Lathrop. Activities covered under the plan  
8 include urban development, mining, expansion of existing urban boundaries, nonagricultural  
9 activities occurring outside of urban boundaries, levee maintenance undertaken by the San Joaquin  
10 Area Flood Control Agency, transportation projects, school expansions, nonfederal flood control  
11 projects, new parks and trails, maintenance of existing facilities for nonfederal irrigation district  
12 projects, utility installation, maintenance activities, managing preserves, and similar public agency  
13 projects.

14 The project study area overlaps a substantial portion of the SJC MSHCP; construction of all project  
15 alternatives would take place within the Primary Zone of the Delta (Delta Zone), which consists of  
16 primarily agricultural habitat types. Currently, approximately 210,488 acres of agriculture, 13,745  
17 acres of grassland, 7,775 acres of riparian, 5,054 acres of nontidal wetland, 2,101 acres of seasonal  
18 wetland, 117 acres of vernal pool, and 1,640 acres of tidal wetland are present within the SJC MSHCP  
19 plan area (Appendix 13D, *Overlapping Habitat Conservation Plan Permanent Surface Impacts*).  
20 Within the overlapping area, the SJC MSHCP targets for acquisition include flooded fields,  
21 grasslands, riparian woodland, row and field crops, and wetlands. However, because the acquisition  
22 and restoration requirements of the SJC MSHCP are based upon mitigation ratios applicable to the  
23 natural community types where impacts occur, and the plan operates on a “pay-as-you-go” basis, the  
24 acquisition targets depend on the amount and location of impacts occurring within the county. Most  
25 of the impacts covered under the plan to date and, consequently, the preservation and creation  
26 efforts, have occurred on cultivated land. The Delta Zone contains approximately 5,100 acres of  
27 existing preserves, all of which are in agricultural habitat types (San Joaquin Council of Governments  
28 2020:21, Table 6).

## 29 East Contra Costa County Habitat Conservation Plan/Natural Community 30 Conservation Plan

31 The East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan  
32 (ECCC HCP/NCCP) was adopted in 2006 by Contra Costa County and the Cities of Brentwood,  
33 Clayton, Pittsburg, and Oakley. Permits were issued in 2007 by USFWS and CDFW for a 30-year  
34 term. A joint powers authority of the agencies receiving the permits and the East Bay Regional Park  
35 District formed the East Contra Costa County Habitat Conservancy to implement the plan.

36 The HCP/NCCP provides regional conservation while improving and streamlining the permit  
37 process for endangered species. In 2012, USACE issued a Regional General Permit to the East Contra  
38 Costa County Habitat Conservancy to provide additional streamlining for wetland regulations. The  
39 HCP/NCCP requires creation of a preserve system of 23,800 to 30,300 acres that will be managed  
40 for the benefit of 28 covered species and their associated natural communities; as of 2019, 14,221  
41 acres have been preserved (East Contra Costa County Habitat Conservancy 2020:ES-2). The range of  
42 impacts and conservation requirements varies depending on whether the current urban limit lines  
43 of the participating cities are expanded.

1 The central western portion of the study area overlaps with the ECCC HCP/NCCP (Table 13-102).  
2 The overlap area is largely cultivated land outside of the urban limit lines of the county and  
3 participating cities. The proposed preserve system for the ECCC HCP/NCCP occurs almost entirely  
4 outside of the study area boundary. Project construction would have impacts in the ECCC HCP/NCCP  
5 plan area in Subzones 6d and 6e (i.e., Southern Complex and Bethany Complex). The land acquisition  
6 requirement for Zone 6 is 250 acres of cropland or pasture outside of Subzones 6d and 6e; within  
7 Subzones 6d and 6e, at least 20 acres of alkali wetland are targeted for acquisition (East Contra  
8 Costa County Habitat Conservation Plan Association 2006:5-41-5-43).

### 9 **East Alameda County Conservation Strategy**

10 The East Alameda County Conservation Strategy (EACCS) provides a mechanism for endangered  
11 species permitting under the CESA and ESA within eastern Alameda County. The conservation  
12 strategy does not directly result in permits for any participating local agency but provides a  
13 framework for endangered species permitting of projects in the study area. The strategy was  
14 completed in 2011 and is currently being utilized by local jurisdictions. The plan was prepared by  
15 Alameda County; the Cities of Dublin, Livermore, and Pleasanton; Alameda County Waste  
16 Management Authority; Alameda County Congestion Management Agency; East Bay Regional Parks  
17 District; Alameda County Resource Conservation Service; and Natural Resource Conservation  
18 Service in consultation with the USFWS, CDFW, and the San Francisco RWQCB. The conservation  
19 strategy addresses the conservation needs of 19 species. In June 2012, USFWS issued a  
20 programmatic Section 7 BiOp with USACE that can be used for CWA Section 404 compliance using  
21 the framework of the conservation strategy for federally listed species. The EACCS does not contain  
22 preserves; rather, it identifies conservation priorities within its 18 Conservation Zones and provides  
23 a conservation easement toolkit to facilitate land conservation. The southwestern portion of the  
24 study area overlaps with a small portion of the EACCS in Conservation Zones 6 and 7. Conservation  
25 priorities within these zones include protecting habitat for San Joaquin kit fox and California red-  
26 legged frog.

27 Each of these plans includes a conservation strategy that implements land restoration, enhancement  
28 and/or acquisition within or near their respective boundaries. The following discussion addresses  
29 whether the Delta Conveyance Project has the potential to conflict with these plans and their  
30 conservation strategies.

## 31 **13.2 Applicable Laws, Regulations, and Programs**

32 The applicable laws, regulations, and programs considered in the assessment of project impacts on  
33 terrestrial biological resources are indicated in Section 13.3.1, *Methods for Analysis*, or the impact  
34 analysis, as appropriate. Applicable laws, regulations and programs associated with state and  
35 federal agencies that have a review or potential approval responsibility have also been considered in  
36 the development of CEQA impact thresholds or are otherwise considered in the assessment of  
37 environmental impacts. A listing of some of the agencies and their respective potential review and  
38 approval responsibilities, in addition to those under CEQA, is provided in Chapter 1, *Introduction*,  
39 Table 1-1. A listing of some of the federal agencies and their respective potential review, approval,  
40 and other responsibilities, in addition to those under NEPA, is provided in Chapter 1, Table 1-2.  
41 Laws and regulations specifically used in the impact analyses are summarized below.

- 1       • **Endangered Species Act (16 United States Code [USC] § 1531 *et seq.*):** The federal ESA and  
2 subsequent amendments provide guidance for conserving federally listed species and the  
3 ecosystems upon which they depend. Section 7 of the act requires federal agencies to consult  
4 with USFWS or National Marine Fisheries Service, as appropriate, to ensure that actions they  
5 authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or  
6 endangered fish, wildlife, or plant species, or result in the destruction or adverse modification of  
7 designated critical habitat for any such species. Section 9 of the act and its implementing  
8 regulations prohibit the take of any fish or wildlife species listed under the ESA as endangered  
9 or threatened, unless otherwise authorized by federal regulations. Species listed under the  
10 federal ESA are treated as special-status species under CEQA and are included for analysis in  
11 this chapter accordingly. In addition, potential effects on designated critical habitat within the  
12 study area are considered.
- 13       • **The Bald and Golden Eagle Protection Act (81 FR 91494–91554):** The Bald and Golden Eagle  
14 Protection Act authorizes “incidental take” of bald and golden eagles if all “practicable”  
15 measures to reduce impacts on eagles are implemented. The USFWS is responsible for issuing  
16 permits and guidance to avoid and minimize effects on the species. USFWS guidance documents  
17 around the Bald and Golden Eagle Protection Act are used in the analysis presented in this  
18 chapter.
- 19       • **Migratory Bird Treaty Act (16 USC § 703 *et seq.*, 50 CFR Part 21):** This act protects  
20 migratory birds by prohibiting intentional taking, selling, or conducting other activities that  
21 would harm migratory birds, their eggs, or nests, unless authorized under a permit, by  
22 prohibiting intentional taking, selling, or conducting other activities that would harm migratory  
23 birds, their eggs, or nests, unless authorized under a special permit. USFWS guidance on the  
24 Migratory Bird Treaty Act was used in the analyses of impacts on special-status birds and in the  
25 development of mitigation measures for these species, as well as other birds protected under  
26 the Migratory Bird Treaty Act.
- 27       • **Federal Noxious Weed Act (7 USC §§ 2801–2813; 7 CFR Part 360):** This act is primarily  
28 concerned with the introduction of federally designated noxious weed plants or seeds across the  
29 international borders of the United States. The Federal Noxious Weed Act also regulates the  
30 interstate movement of designated noxious weeds under USDA’s permit system. This act would  
31 be a factor in any decisions to import construction materials and equipment, including  
32 aggregate, from out-of-state or out-of-country. Noxious weeds degrade wildlife habitat and are  
33 difficult to eradicate once established. Resources available in part due to this act were used for  
34 the analysis of effects from invasive and noxious plants.
- 35       • **Clean Water Act of 1972 (33 USC §§ 1341 and 1344):** CWA Section 401 specifies that states  
36 must certify that any activity subject to a permit issued by a federal agency (e.g., USACE) meets  
37 all state water quality standards. In California, the State Water Board and the RWQCBs are  
38 responsible for certifying activities subject to any permit issued by the USACE pursuant to CWA  
39 Section 404 or pursuant to Section 10 of the Rivers and Harbors Act of 1899. CWA 404  
40 authorizes USACE and EPA to issue permits to regulate the discharge of “dredged or fill  
41 materials into waters of the United States.” Should activities such as dredging or filling of  
42 wetlands or surface waters be required for project implementation, then permits obtained in  
43 compliance with CWA Section 404 would be required for the project applicant(s). CWA guidance  
44 from USACE is used in the analyses of impacts on aquatic resources in this chapter.

- 1       • **California Endangered Species Act (Fish & G. Code §§ 2050–2116):** CESA prohibits the take  
2       of any fish, wildlife, or plant species that has been listed as endangered or threatened or  
3       designated as a candidate for listing. CESA contains a procedure for CDFW to issue an incidental  
4       take permit, authorizing take of listed and candidate species that is incidental to an otherwise  
5       lawful activity, subject to specified conditions, including impacts of take that are fully mitigated.  
6       Under CESA, if a project would result in take, including take from obstructions to wildlife  
7       movement or migration, mitigation would be required to avoid impacts on listed wildlife  
8       species. Species listed under CESA are treated as special-status species under CEQA and are  
9       included for analysis in this chapter accordingly.
- 10       • **California Fish and Game Code pertaining to Migratory Birds and Raptors (Fish & G. Code**  
11       **§§ 3503 and 3503.5)** protects non-special-status migratory birds and raptors. California Fish  
12       and Game Code Sections 3503 and 3503.5 were used in the analyses of impacts on special-status  
13       birds and in the development of mitigation measures for these species, as well as other birds  
14       protected under the California Fish and Game Code.
- 15       • **Fully Protected Species (Fish & G. Code §§ 3511, 4700, and 5050):** California Fish and Game  
16       Code prohibits take or possession of fully protected species at any time. CDFW is unable to  
17       authorize incidental take of fully protected species when activities are proposed in areas  
18       inhabited by these species, except pursuant to an approved NCCP. California Fish and Game  
19       Code Sections 3511, 4700, and 5050 were used in the analyses of impacts on fully protected  
20       species and in the development of mitigation measures for these species.
- 21       • **California Native Plant Protection Act of 1977 (Fish & G. Code §§ 1900–1913):** The  
22       California Native Plant Protection Act (NPPA) is intended to preserve, protect, and enhance  
23       endangered or rare native plants in the state. The NPPA gave the California Fish and Game  
24       Commission the power to designate native plants as endangered or rare, and protect  
25       endangered and rare plants from take. Designations by CDFW stemming from the NPPA were  
26       used in this chapter for determining plant species that qualify as special-status under CEQA.
- 27       • **Lake and Streambed Alteration Agreement (Fish & G. Code §§ 1600–1607):** California Fish  
28       and Game Code Sections 1600–1607 require notifying CDFW prior to any project activity that  
29       might (1) substantially divert or obstruct the natural flow of any river, stream, or lake; (2)  
30       substantially change or use any material from the bed, channel, or bank of any river, stream, or  
31       lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or  
32       ground pavement that may pass into any river, stream, or lake. If, after notification, CDFW  
33       determines that the activity may substantially adversely affect fish and wildlife resources, a Lake  
34       or Streambed Alteration Agreement under Section 1602 will need to be obtained. The  
35       Streambed Alteration Program (§ 1600 *et seq.*) requires an entity to notify CDFW prior to  
36       commencing any activity that may result in the modification of a river, stream, or lake that could  
37       adversely affect existing fish or wildlife resources. Information from the Streambed Alteration  
38       Program (§ 1600 *et seq.*) was used for analyzing effects on associated resources in this chapter.
- 39       • **Porter-Cologne Water Quality Control Act of 1969 (Water Code § 7):** Under the Porter-  
40       Cologne Act definition, *waters of the State* are “any surface water or groundwater, including  
41       saline waters, within the boundaries of the state.” Although all waters of the United States that  
42       are within the borders of California are also waters of the State, the reverse is not true.  
43       Therefore, California retains authority to regulate discharges of waste into any waters of the  
44       State, regardless of whether USACE has concurrent jurisdiction under CWA Section 404, and  
45       defines *discharges to receiving waters* more broadly than the CWA does. Guidance from the



1 California State Water Resources Control Board is used in the analyses of impacts on aquatic  
2 resources in this chapter.

- 3 • **Local Policies and Ordinances:** Several general plans and local codes for the cities and  
4 counties that overlap with the project footprint contain policies and ordinances for the  
5 protection of biological resources. These local agencies include the city and county of  
6 Sacramento, the City of Lodi, the City of Stockton, San Joaquin County, Alameda County, and  
7 Contra Costa County. Policies, codes, and ordinances from these local agencies were reviewed  
8 for potential conflicts with the implementation of the project alternatives.
- 9 • **Habitat Conservation Plans, Natural Community Conservation Plans, and Other Regional  
10 Conservation Plans:** The study area for this chapter overlaps with several conservation plans.  
11 To comply with CEQA, potential conflicts with the provisions of an adopted HCP, NCCP, or other  
12 approved local, regional, or state HCP were analyzed in this chapter.

## 13 13.3 Environmental Impacts

14 This section describes the direct and cumulative environmental impacts associated with terrestrial  
15 biological resources that would result from project construction, operation, and maintenance. It  
16 describes the methods used to determine the impacts of the project and lists the thresholds used to  
17 conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify,  
18 reduce, eliminate, or compensate for) significant impacts are provided.

### 19 13.3.1 Methods for Analysis

20 This section describes the quantitative and qualitative methods used to assess the impacts of  
21 implementing the project alternatives on terrestrial biological resources. These impacts would be  
22 associated with construction, operations, and maintenance of the project, implementation of the  
23 CMP described in Appendix 3F, *Compensatory Mitigation Plan for Special-Status Species and Aquatic  
24 Resources* and implementation of other mitigation measures. The methods used for the different  
25 phases of the project are broken out into subheadings below. The methods for construction are  
26 further defined by the resource type.

27 Generally, for all phases of the project and resources, the analysis contains an assessment of both  
28 the direct and reasonably foreseeable indirect impacts of the project alternatives.

29 All quantified acreage impacts are reported out to the hundredths place, which aligns with the level  
30 of rounding used in DWR's aquatic resources delineation.

#### 31 13.3.1.1 Impact Mechanisms

32 Impact mechanisms that are common to construction, operations, maintenance, and CMP-related  
33 restoration include the following.

- 34 • Ground disturbance—Most common examples include grading, excavation, trenching, drilling,  
35 and placement of fill, and vibrations associated with those ground-disturbing activities.
- 36 • Vegetation removal—Examples include grubbing, trimming, and mowing.
- 37 • Hazardous materials—Examples include spills of fuels, oils, cement, and herbicide application.

- 1 • Vehicle movement—Examples include construction personnel vehicles, haul trucks, and grading  
2 equipment movement on local roads, construction access roads, and off-road vehicle movement  
3 in portions of work areas.
- 4 • Noise—Examples include equipment operation, pile driving, and helicopters.
- 5 • Visual disturbance—Includes permanent lighting at project facilities, temporary lighting used  
6 for construction, and disturbances caused by the presence of construction vehicles and  
7 personnel.
- 8 • Water quality—Includes the creation and mobilization of methylmercury, selenium, pesticides,  
9 and microcystins.
- 10 • Dewatering—Includes pumping and draining of waterbodies, including cofferdam installation  
11 where necessary.
- 12 • Dust—Results from ground disturbance and vegetation removal.

### 13 **13.3.1.2 Evaluation of Construction Activities**

14 The general construction activities common to all project alternatives have a potential to result in  
15 permanent and temporary impacts on terrestrial biological resources and include the following  
16 activities. The assumptions used for assessing these impacts are also included.

- 17 • North Delta Intakes—The intakes would include permanent facilities and temporary work areas.  
18 Intake construction would involve, in part, in-water work along the Sacramento River.  
19 Construction would occur over a 12- to 14-year period, depending on the alternative.
- 20 • Tunnels—The construction of the tunnels, using tunnel boring machines, do not have the  
21 potential to cause impacts on terrestrial biological resources, except for the construction of the  
22 shafts and the storage of the RTM, which are listed separately below.
- 23 • Tunnel Shafts—Tunnel shafts would include permanent facilities and temporary work areas.  
24 Tunnel shaft pads would be constructed above the 100-year water surface elevation plus sea  
25 level rise and 2 feet of freeboard. The shaft would be raised above the shaft pad to protect  
26 against the 200-year flood event plus sea level rise at the year 2100. The construction period  
27 would vary by shaft and alternative but would be between 2 and 11 years.
- 28 • Reusable Tunnel Material—RTM areas would be both temporary and permanent depending on  
29 location, but because of the uncertainty of being able to restore these areas as habitat for  
30 terrestrial species they are all considered to be permanent impacts.
- 31 • Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c)—Southern Complex construction  
32 includes both permanent facilities and temporary work areas. Construction would occur over a  
33 10- to 11-year period, depending on the alternative.
- 34 • Bethany Complex (Alternative 5)—Bethany Complex construction includes both permanent  
35 facilities and temporary work areas. Construction would occur over a 10-year period.
- 36 • Bouldin Island Levee Modifications (Alternatives 1, 2a, 2b, and 2c)—Construction of levee  
37 improvements would take approximately 1 month. The total size of the construction site and  
38 post-construction site for the Bouldin Island levee modifications would be approximately 251  
39 acres, with an additional 90 acres for temporary levee modification access roads and impacts on  
40 terrestrial resources are based on these acreages. However, to account for ongoing work by  
41 levee maintenance agencies, the extent of levee repairs would be reevaluated during the design

1 phase and coordinated with the local levee maintenance agency and could result in additional  
2 permanent and temporary impacts.

- 3 ● Access Roads—Access roads would result in permanent and temporary impacts. The access  
4 road activities would include widened and improved roads, new roads, and new and widened  
5 bridges. Construction access roads would remain post-construction for maintenance access to  
6 the facilities. Improvements to existing State and local roadways would also remain after  
7 construction. Construction of most access roads would vary from 1 to 8 months, depending on  
8 the location. Bridge widening efforts could take longer.
- 9 ● Rail-Served Materials Depot—On-site rails would be used to connect to existing Union Pacific  
10 Railroad and BNSF Railway. The railways would be used to haul construction materials and  
11 RTM. The on-site rails would be temporary and used over the 12- to 14-year period of  
12 construction.
- 13 ● Electric Power—Transmission and distribution line construction for project alternatives would  
14 consist of underground construction, overhead construction, and overhead construction on  
15 existing lines. For the analysis of construction impacts on terrestrial biological resources, the  
16 following assumptions were applied.
  - 17 ○ All permanent new aboveground distribution lines would be constructed within access  
18 roads and it is assumed that there would be no ground-disturbing impacts outside of the  
19 access road footprints.
  - 20 ○ All permanent underground transmission lines were treated as a permanent impact within  
21 the 25-foot-wide easement that would be established above the line. No agriculture  
22 requiring cultivation would be allowed in this easement and no woody vegetation (e.g.,  
23 riparian) would be allowed to reestablish. Underground transmission lines for facilities used  
24 during construction only, such as park-and-ride lots, would have long-term temporary  
25 impacts; lines would be de-energized and abandoned in-place after construction and  
26 restrictions within the easement would not be required thereafter. Lines would be installed  
27 using open-cut trenches and directional drilling to go underneath existing infrastructure  
28 (e.g., highways) and waterways.
  - 29 ○ Some new overhead transmission line construction would take place over more than 1 year  
30 (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c). The current level of design for new  
31 transmission lines is conceptual and final design criteria would be developed by the  
32 infrastructure owner. The conceptual design currently consists of a 150-foot-wide corridor  
33 where most construction-related disturbance is anticipated to take place. In order to  
34 estimate what permanent and temporary impacts on terrestrial biological resources would  
35 be, assumptions were developed for the amount of ground disturbance based on  
36 information obtained from other transmission line construction projects of a similar size.  
37 These assumptions include the following.
    - 38 ● Towers—Towers were assumed to be lattice towers with four footings requiring 7.5  
39 square feet of permanent impact per footing for a total permanent impact of 30 square  
40 feet. For towers in agricultural areas, no agricultural production would be possible  
41 beneath or immediately adjacent to the towers. For agricultural areas, it was assumed  
42 that 900 square feet of agricultural land would be permanently affected per tower.  
43 Towers were assumed to be spaced 1,250 feet apart. Temporary work areas around  
44 each tower were assumed to be 40,000 square feet and in use for more than 1 year.

- 1           ● Pull sites—Sites used for stringing transmission lines on towers (pull sites) were  
2           assumed to require 30,000 square feet of temporary work area per pull site. Pull sites  
3           were assumed to be spaced every mile and at every point where a line made a turn. Pull  
4           sites were assumed to be in use for more than 1 year.
- 5           ● Laydowns and Landing Zones (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c)—Areas used  
6           for staging equipment and landing helicopters (laydown and landing zones) were  
7           estimated to be needed for every 5 miles of transmission line and each laydown and  
8           landing zone was estimated to require 2 acres. Laydown and landing zones were  
9           assumed to be needed for more than 1 year; however actual helicopter use would be  
10          limited to a total of 21 days.
- 11          ● Temporary access roads—It was assumed a 24-foot-wide temporary access road would  
12          be needed within the 150-foot-wide corridor for the duration of transmission line  
13          construction, which would be more than 1 year.
- 14          ○ Overhead construction on an existing transmission line would be required to power the  
15          intakes and Twin Cities Complex under all project alternatives. The project would attach an  
16          additional power line to an existing Sacramento Municipal Utility District (SMUD) line that  
17          follows Franklin Boulevard from around Hood-Franklin Road south to Lambert Road. This  
18          new line would be a short segment (approximately 4 miles) constructed in parallel (i.e., at  
19          the same elevation) to the existing power line on these poles. All construction activity is  
20          assumed to be done from the existing roadway and would not result in any permanent or  
21          temporary ground disturbance.
- 22          ● SCADA Facilities—Fiber optic cables that are part of the supervisory control and data  
23          acquisition system (SCADA) would be installed throughout the project for all of the alternatives.  
24          SCADA lines would be both underground and overhead. Construction for both types would take  
25          less than 1 year in a given location.
- 26          ○ Underground SCADA lines are assumed to require a 25-foot-wide temporary construction  
27          area along the length of the line and there would be no permanent restrictions on activities  
28          above these lines (i.e., prohibitions on cultivation or vegetation management). In most areas  
29          SCADA lines are situated within existing or planned roads but there are some instances  
30          where they are outside of roadways. Construction would involve open-cut trenches and  
31          directional drilling to go beneath existing infrastructure (e.g., highways) and waterways.  
32          Overhead SCADA lines would be attached to existing lines but may require permanent  
33          impacts associated with pole upgrades. Where upgrades are required, each existing pole  
34          was assumed to require 50 square feet of permanent impact. SCADA lines were assumed to  
35          be hung below existing power lines and in parallel with existing communications lines.
- 36          ● Park-and-Ride Lots—Park-and-ride lot construction would result in permanent impacts when  
37          considering the duration of the construction but would ultimately be removed.
- 38          ● Fencing and Lighting—Security fencing would be installed around all permanent project  
39          facilities. Lighting may be necessary for some construction sites if work occurs at night and for  
40          construction trailers. Permanent facilities would have exterior lighting with motion detectors  
41          that would only be used when maintenance personnel are present.
- 42          ● Field Investigations—As discussed in Chapter 3, *Description of the Proposed Project and*  
43          *Alternatives*, Section 3.15, *Field Investigations*, field investigations would be conducted after  
44          adoption of the EIR prior to and during construction to more specifically identify appropriate

1 construction methods and design criteria addressed in the final design documents, verify soil  
2 rehabilitation methods, confirm the locations of existing utilities, and address the establishment  
3 of geological and groundwater monitoring programs (Delta Conveyance Design and  
4 Construction Authority 2022a, 2022b). Field investigations would involve a variety of ground-  
5 disturbing activities that would vary in duration from several hours to approximately 6 weeks  
6 (Section 3.15, *Field Investigations*; Delta Conveyance Design and Construction Authority 2022a,  
7 2022b). The following field investigations would be conducted within proposed surface  
8 construction footprints of project facilities (including portions of tunnel alignments): test  
9 trenches, cone penetration tests (CPTs), soil borings, electrical resistivity tomography (ERT),  
10 groundwater testing and monitoring, monument installation, pile installation test methods at  
11 the North Delta intakes, pilot studies for settlement, agronomic testing, and utility potholing.  
12 Temporary disturbances from these activities are described qualitatively but are not  
13 characterized as an additional loss of habitat and are not included in impact acreages. The  
14 Bethany Fault Study geotechnical investigations (conducted under Alternative 5) would be  
15 completed in a single day and would involve placing approximately 20 ERT probes 0.5 inches in  
16 diameter. The study would be conducted entirely on foot, perpendicular to the tunneled portion  
17 of the Bethany Reservoir Aqueduct (Delta Conveyance Design and Construction Authority  
18 2022b). Because of its small footprint and the short (1-day) duration of the disturbance from the  
19 Bethany Fault Study, minor disturbances are described qualitatively but impacts are not  
20 quantified and are considered negligible. For those geotechnical investigations which include  
21 test trenches, CPTs, soil borings, and geophysical arrays that would take place over the tunnel  
22 alignments but outside of other surface footprints and for the evaluation of the West Tracy Fault,  
23 temporary impact acreages for these areas were estimated using the following assumptions:

- 24 ○ The West Tracy Fault geotechnical investigations would take place at fixed locations and  
25 would involve test trenches, CPTs, and borings. To estimate the temporary impacts from  
26 these activities it was assumed that up to five test trenches (up to approximately 1,000 feet  
27 long, 3 feet wide, and 20 feet deep) would be excavated along a line running from the  
28 southeast of Byron to the southeast of the Clifton Court Forebay. The temporary work area  
29 for the trenches would be approximately 200 feet wide (100 feet on each side of the  
30 centerline of the trench). The trenches would remain open for up to 6 weeks, depending on  
31 the findings, and would be backfilled completely upon the completion of observations of soil  
32 conditions within the trench. In addition to the test trenches, two arrays of surface  
33 geophysical surveys (1,000 feet long and 3 feet wide). The temporary work area for the  
34 geophysical surveys would be approximately 50 feet wide. Additionally, up to 15 CPTs and 6  
35 soil borings would be completed to a depth of 150 feet.
- 36 ○ To estimate temporary impacts from geotechnical investigations over tunnel alignments, the  
37 following assumptions were used:
  - 38 ● Wetlands and waters would be avoided, except necessary overwater borings in channels  
39 large enough to accommodate a barge. A single overwater boring would be completed at  
40 each river, canal, or slough crossing (Delta Conveyance Design and Construction  
41 Authority 2022a, 2022b).
  - 42 ● Soil boring and CPT sites would each result in approximately 0.84 acre of disturbance  
43 per site, which includes a 0.23-acre (10,000-square-foot) area of temporary disturbance  
44 for drilling and staging plus an additional 0.61 acre of temporary disturbance associated  
45 with accessing the sites.

- 1           • Soil borings and CPTs would be spaced approximately every 1,000 feet between tunnel  
2 shafts, and the spacing between soil borings and CPTs would be approximately 500 feet  
3 (Delta Conveyance Design and Construction Authority 2022a, 2022b).
- 4           • The total amount of temporary disturbance for each tunnel alignment segment was  
5 estimated by multiplying the number of sites (soil borings and CPTs combined) by the  
6 0.84-acre area of disturbance per site. The total acreage was then proportionally spread  
7 across the land cover types occurring within a given tunnel alignment (e.g., if 50% of the  
8 alignment is agricultural then 50% of impacts would be assigned to agricultural).

9           The impact mechanisms from construction activities would include all of those listed in Section  
10 13.3.1.1, *Impact Mechanisms*.

11           Some impacts described in this chapter have been categorized based on their duration. Project  
12 construction impacts on terrestrial biological resources could be permanent, long-term temporary,  
13 or temporary.

14           Impacts have been categorized as permanent where a biological resource would be removed or lost  
15 and would not be replaced at its original site. Permanent impacts would occur primarily at  
16 construction sites. Construction of aboveground project facilities would permanently remove or  
17 alter habitats and could result in the loss of individual special-status plants or animals. Development  
18 and use of RTM storage sites have been characterized as permanent losses of biological resources  
19 because of the uncertainty of replacing the resource and the length of time between the loss of the  
20 resource and the first opportunity to restore or replace the resource after drying and testing of the  
21 RTM. Activities associated with tunneling and RTM placement are likely to occur across multiple  
22 years at RTM storage areas. All ground-disturbing activities affecting special-status plants are  
23 considered to be permanent.

24           Impacts on wildlife habitat have been categorized as long-term temporary where construction at a  
25 given location would take place over multiple years and the area would not be restored to its pre-  
26 disturbance condition until the completion of construction. Areas considered to have long-term  
27 temporary impacts include the work areas for the Bethany Reservoir Aqueduct, concrete batch  
28 plants, construction water pumping plant, Southern Forebay, substations, intakes, overhead  
29 transmission lines, the outlet and control structures, ring levees, Bethany Reservoir Pumping Plant  
30 and Surge Basin, and shafts. Even though many of these temporary work areas would eventually be  
31 restored, they would be unavailable to multiple generations of wildlife during construction, and  
32 therefore for compensatory mitigation purposes are treated the same as permanent impacts and are  
33 presented as permanent impacts for wildlife in the impact tables.

34           Impacts on habitat have been categorized as temporary where construction-related habitat losses  
35 would occur over less than 1 year and would be restored to the affected area's pre-disturbance  
36 condition within 1 year of the initial habitat loss. The areas that would be expected to be restored  
37 within 1 year of disturbance include the work areas associated with levee access roads, SCADA work  
38 areas, road work areas, railroad work areas, underground transmission line work areas, and  
39 metering areas. Temporary impacts on special-status plants are limited to minor effects that do not  
40 disturb the soil, such as driving a vehicle across a stand of annual plants that have dispersed their  
41 seeds and completed their life cycle.

## 1 **Methods Used to Assess Impacts on Sensitive Natural Communities**

2 The natural community impact analysis includes a discussion of the direct effects of project  
3 construction of facilities. In addition, effects on habitat value have been considered and addressed  
4 where relevant.

5 The GIS layers depicting all project alternative features that could affect the natural communities  
6 (e.g., grading, excavation) were intersected with the natural communities GIS layer and the results  
7 were reported in acres.

8 As mentioned in Section 13.1.2.1, *Natural Community Mapping Methods*, under *Aquatic Resources*  
9 *Delineation Data*, there are differences in the amount of DWR-mapped aquatic resources and those  
10 similar types in the underlying CDFW vegetation data used. Though the GIS analysis intersected  
11 both data sets, the tables in Section 13.3.3.2, only report impacts on the aquatic resources mapped  
12 by DWR that by definition are wetlands or other waters, which includes nontidal freshwater  
13 perennial emergent wetland, nontidal perennial aquatic, other seasonal wetlands, tidal freshwater  
14 emergent wetland, and tidal perennial aquatic. For those communities that can contain both a  
15 wetland and upland component, which are alkaline seasonal wetland complex, vernal pool complex,  
16 and valley/foothill riparian, the reported impacts for those communities include both the DWR  
17 wetlands (wetland component) and those communities mapped by CDFW (upland component). The  
18 portion of CDFW “wetland” and “water” types not reported accounts for 0.07% of the total impacts  
19 (0.3 to 2 acres, depending on alternative), which are either adjacent agricultural, developed, or  
20 upland areas.

## 21 **Methods Used to Assess Impacts on Special-Status Species**

22 The analysis of effects on special-status plant and wildlife species in this chapter considers the direct  
23 effects of project construction for each of the alternatives. Direct effects were assessed both  
24 quantitatively and qualitatively. Permanent and temporary impacts from project construction were  
25 quantified in GIS by overlaying the project alternative facility footprints on modeled habitat for the  
26 species and species occurrences.

27 Habitat models were developed because project design and the impact analysis were being done  
28 simultaneously, and the surveys of the project footprint have not been completed recently or have  
29 not been done for some areas. Habitat models serve different purposes for the analyses of impacts  
30 on land cover, special-status wildlife, and special-status plants. Because the land cover mapping was  
31 based on recent aerial photography, the habitat models have a high likelihood of accurately  
32 depicting current conditions and identifying the locations of sensitive natural communities.

33 Habitat models for special-status wildlife identify areas where suitable habitat is present, and  
34 because wildlife is mobile, the models show where the wildlife species are most likely to occur. By  
35 its nature, this type of model tends to overestimate suitable habitat by being as inclusive as possible  
36 in the absence of site-specific data on vegetation structure, species composition, hydrology,  
37 occurrence of or proximity to other habitat elements, and other variables that would provide more  
38 certainty with respect to habitat quality and the potential for occurrence. For example, areas of  
39 suitable habitat for a species may not be identified if they are smaller than the minimum mapping  
40 unit size for a specific landcover layer (e.g., individual trees used for nesting by Swainson’s hawk or  
41 other raptors). Still, the more likely scenario is that an overestimate occurs as small acreages of  
42 unsuitable habitat are absorbed into larger suitable habitat polygons. Therefore, although the  
43 models portray a reasonable distribution of habitat for the species addressed in the Draft EIR, they

1 do not necessarily indicate with certainty that species are restricted to those areas. Instead, the  
2 models indicate that nonhabitat areas have a much lower probability of species occurrence  
3 compared with areas identified as habitat. In some cases, the models were developed using site-  
4 specific species occurrence information from the CNDDDB (2020) and information from extensive  
5 field surveys conducted in and around water conveyance facility footprints by DWR (*2009 to 2011*  
6 *Bay Delta Conservation Plan EIR/EIS Environmental Data Report*) (California Department of Water  
7 Resources 2011). The DWR survey results were used together with occurrence data in the CNDDDB to  
8 determine whether construction footprints would affect known species occurrences. The DWR  
9 surveys did not occur on all lands within the conveyance alignment footprints and the CNDDDB data  
10 is limited by where previous surveys have occurred; therefore, the actual effects on individuals or  
11 populations may be greater than is presented in the species effects discussions. Though the analysis  
12 discusses how CNDDDB occurrences would be affected, it is not the basis for determining potential  
13 effects on individuals or populations. The analysis assumes that areas of modeled habitat contain  
14 individuals and populations. Figure 13-1 presents the stepwise process to identify modeled habitat,  
15 suitable habitat, and occupied habitat for special-status species.

16 Models for special-status plants can identify where potential habitat is present, but because plants  
17 are not mobile, the likelihood that plants are present or would be affected can only be determined  
18 by surveys. The models for special-status plants were developed from published information about  
19 species' habitat characteristics, from site-specific species occurrence information obtained from the  
20 CNDDDB (2020), and in some cases, from soil survey maps (Soil Survey Staff, Natural Resources  
21 Conservation Service 2019). The purpose of modeling habitat for special-status plants was to  
22 identify locations where there is a higher likelihood that the plants could be affected and to  
23 characterize the type and magnitude of the impacts that could affect them. Figure 13-1 presents the  
24 stepwise process to identify modeled habitat, suitable habitat, and occupied habitat for special-  
25 status species.

26 Project construction impacts were also assessed qualitatively by considering effects of habitat  
27 fragmentation, connectivity, patch size and degradation of habitat functions. Impacts of constructing  
28 the project alternatives consist of habitat removal, construction-related disturbances (e.g.,  
29 disruption of breeding and foraging behaviors from noise, light, pedestrian movement), injury and  
30 mortality of wildlife individuals, immediate displacement of wildlife, and immediate degradation of  
31 habitats. Impacts on plants include those effects where living plants may be damaged or crushed  
32 (seedlings) by the movement or parking of vehicles, the placement of equipment and supplies, site  
33 grading, and side casting of drill spoils and excavated materials. Ground disturbance can kill or  
34 damage mature plants or eliminate their habitat. Excavation alters soil properties and may create  
35 conditions unsuitable for the growth of some species or favor their replacement by other species.  
36 The roots of shrubs and other perennial species are susceptible to damage from soil compaction by  
37 equipment or construction materials.

38 Possible indirect impacts on special-status plants and special-status wildlife habitat could occur  
39 from construction activities that result in changes to hydrology and erosion that alters or degrades  
40 habitat, or ground disturbance that facilitates the establishment of invasive plant species that  
41 compete with native vegetation and alter the vegetation community in a way that can make it  
42 unsuitable for wildlife species. Potential indirect impacts on special-status vernal pool aquatic  
43 invertebrates could occur from changes to the hydrology that supports habitat for these vernal pool  
44 species. To quantify indirect impacts on special-status vernal pool aquatic invertebrates, project  
45 activities that could result in permanent changes to topography, subsurface hydrology, or the  
46 amount of impervious surface within 250 feet of this habitat were considered to have the potential



1 to result in changes to the hydroperiod of this habitat and thus its ability to support special-status  
2 vernal pool aquatic invertebrates.

3 The analysis of construction impacts establishes the maximum potential for impacts and may not  
4 reflect the final impact that requires mitigation. The actual impacts on special-status plants and the  
5 need for mitigation cannot be determined until the special-status plant surveys have been  
6 completed. Once project work areas become accessible, they would be assessed and mapped for  
7 natural communities, suitable species habitat, and, where applicable, surveyed for the presence of  
8 species. Details on the process to verify habitat suitability and defining the ultimate mitigation  
9 commitment are provide for special-status plants in Mitigation Measure BIO-2a: *Avoid or Minimize*  
10 *Impacts on Special-Status Natural Communities and Special-Status Plants*, for special-status wildlife  
11 in various measures throughout the chapter, and in Appendix 3F, Sections 3F.2.3, *Impacts on Special-*  
12 *Status Species*, and 3F.4.2.1, *Mitigation Credits from Approved Banks*).

13 For quantifying the impacts of construction on valley elderberry longhorn beetle, only the riparian  
14 portion of the species model described in Appendix 13B, Section 13B.39, *Valley Elderberry Longhorn*  
15 *Beetle*, was used to estimate permanent and temporary impacts on the species. The “other potential  
16 habitat” portion of the model was used to identify where additional shrubs may occur and not to  
17 quantify actual impacts on habitat because although these areas may contain elderberry shrubs,  
18 they are typically less frequent and at lower densities than in riparian habitat, and these areas  
19 generally do not provide the same connectivity and opportunities for future establishment as  
20 riparian habitat does. The other potential habitat portion of the model would be used to help focus  
21 future survey efforts in work areas once they become accessible prior to construction.

22 The analysis for potential impacts on Sacramento and Antioch Dunes anthicid beetles (*Anthicus*  
23 *sacramento* and *A. antiochensis*, respectively) did not rely on the use of modeled habitat, as  
24 discussed in Appendix 13B, Sections 13B.37, *Antioch Dunes Anthicid Beetle*, and 13B.38, *Sacramento*  
25 *Anthicid Beetle*, respectively, because the specific habitat requirements of the species—sand dunes,  
26 sand bars, and dredge spoil piles—occur at a finer scale than the land cover data used. The potential  
27 for impacts was assessed qualitatively by reviewing aerial imagery for the presence of suitable  
28 habitat within and adjacent to project facilities and assessing whether construction activities at  
29 those locations would result in the alteration of suitable habitat or affect the species in other ways.

30 The impact analysis of construction on bank swallow relies on the information in the species  
31 account rather than a habitat suitability model, as described in Appendix 13B, Section 13B.79, *Bank*  
32 *Swallow*.

### 33 **Methods Used to Assess Effects of Construction Noise on Sandhill Cranes**

34 Sandhill cranes are present in the study area September 15 through March 15 and have many  
35 known habitat areas for roosting, foraging, and loafing behavior. These habitat areas occur in  
36 suitable croplands and wetlands, many of which are in close proximity to and directly within the  
37 proposed construction areas. Cranes spend the nighttime hours (dusk to dawn) at roost sites; the  
38 morning and evening hours in foraging habitat (generally, sunrise to 10:30 a.m. and 2:30 p.m. to  
39 sunset); and the midday (generally 10:30 a.m. to 2:30 p.m.) loafing in these areas and other areas  
40 without optimal foraging, but away from active human disturbances.

41 The evaluation of noise impacts on birds and their behavior is difficult. A summary of the effects of  
42 highway noise on birds in a California Department of Transportation (Caltrans) report (Dooling and  
43 Popper 2007:36) provides a useful list of variables that could affect how noise is perceived by birds,

1 resulting in the outcome of any noise-related indirect effects. As described in the Caltrans report,  
 2 there are many complications in assessing the effects of noise independent of several confounding  
 3 variables, many of which are relevant to this analysis.

4 Without taking each of these potential variables (and others) into consideration, appropriate  
 5 correlations between road noise and bird behavior cannot be made. These variables include, but are  
 6 not limited to:

- 7 1) Bird species and their style of acoustic communication.
- 8 2) Bird species and their behavior in the presence of adverse stimuli.
- 9 3) Age and experience of the birds.
- 10 4) Hearing capabilities of a species in quiet.
- 11 5) Hearing capabilities of a species in noise.
- 12 6) Other kinds of stimuli associated with highways that might include (among others).
  - 13 a. Visual signals (vehicle movement).
  - 14 b. Vehicle-produced air pollution.
  - 15 c. Substrate vibrations resulting from the vehicles moving on the highway.
  - 16 d. The ecosystem near the roadway including substrate, vegetation, etc.
  - 17 e. Food supply near the highway.

18 Primary noise sources in the study area are traffic traveling on surrounding freeways, highways, and  
 19 rural roadways; agricultural operations; overhead commercial aircraft; and recreation related noise  
 20 (e.g., fishing boats and waterski boats). Land uses near sandhill crane habitat are primarily rural and  
 21 consist of agricultural use and low-density residential development. As such, existing noise levels  
 22 are in the range of 40 to 50 dBA (A-weighted decibels). Typical ambient sound levels as a function of  
 23 human population density are presented in Table 13-4, below.

24 **Table 13-4. Human Population Density and Associated Ambient Noise Levels**

Human Population Density Type	dBA, $L_{dn}$
Rural	40-50
Small town or quiet suburban residential	50
Normal suburban residential	55
Urban residential	60
Noisy urban residential	65
Very noisy urban residential	70
Downtown, major metropolis	75-80
Area adjoining freeway or near major airport	80-90

25 Source: Hoover and Keith 2000:2-12.

26 dBA = A-weighted decibels;  $L_{dn}$  = Day-night sound level.  
 27

### 28 ***Sensitivity to Noise and Thresholds for Mitigation***

29 The general human response to changes in sound levels having similar frequency content (for  
 30 example, comparing increases in continuous traffic sound levels) is summarized as follows.

- 1 • A 3 decibel (dB) change in sound level is considered a barely noticeable difference.
- 2 • A 5 dB change in sound level will typically be noticeable.
- 3 • A 10 dB change in sound level is considered to be a doubling in loudness.

4 This may not be an appropriate metric for sandhill cranes. Because of the scarcity of data on  
5 unweighted intensities of source noise, for this analysis we assume that sandhill cranes, like most  
6 vertebrate animals, have a hearing sensitivity greater than that of humans, therefore, small changes  
7 in ambient noise (e.g., 3 dB) are assumed to be noticeable. Any errors this may introduce are  
8 compensated by use of a very conservative metric.

9 A wide variety of construction equipment would be used at each facility construction site and would  
10 vary throughout the construction period. Each of the major equipment types associated with  
11 construction are analyzed using the methods discussed in Chapter 24, *Noise*, Section 24.3.1.2,  
12 *Evaluation of Construction Activities*, including noise levels from pile driving (Table 24-5), heavy  
13 construction equipment (Table 24-6), and traffic noise.

14 Effects of construction noise were estimated by calculating the distances from construction sites  
15 subject to noise above 60 dBA and 50 dBA. To assess the potential effect of noise on greater and  
16 lesser sandhill cranes, an overlay of the resulting sound level contours (Appendix 24A, *Sound Level  
17 Contours*), on the modeled greater sandhill crane and lesser sandhill crane foraging habitat and  
18 known temporary and permanent roost sites was used to conduct a conservative analysis of the  
19 areas affected by expected noise levels above 60 dBA and 50 dBA. In most of the study area, the  
20 noise analysis was conducted based on the assumption that there was direct line of sight from  
21 sandhill crane habitat areas to the construction site, and therefore is a conservative estimate of  
22 effects. However, in many areas, existing levees and other topographic variation would partially or  
23 completely block the line of sight and function as effective noise barriers substantially reducing  
24 noise transmission. The elevation of the S. P. Cut levee was incorporated into the sound level  
25 contours to develop a more accurate estimate of noise in the vicinity of the Stone Lakes National  
26 Wildlife Refuge. Although USFWS uses 60 dBA as a significance threshold for other special-status  
27 bird species such as least Bell's vireo and California gnatcatcher (County of San Diego 2021:2.4-3;  
28 Ldn Consulting Inc. 2014:13; California Department of Fish and Wildlife 2013:2), in the absence of  
29 data indicating the species-specific effect that noise levels above baseline would have on sandhill  
30 cranes, a conservative approach of also assessing noise levels above 50 dBA was used.

## 31 **Methods Used to Assess Impacts on State- and Federally Protected Aquatic** 32 **Resources**

33 The impacts on state- and federally protected aquatic resources were analyzed both quantitatively  
34 and qualitatively. The quantitative analysis involved intersecting the GIS layer of aquatic resources  
35 mapped by DWR with the GIS layers depicting all project alternative features that could result in the  
36 potential for permanent, long-term temporary, and temporary discharge of dredged or fill material  
37 in these aquatic resources.

38 The project alternatives were also assessed for their potential to result in temporary and permanent  
39 changes to the hydrology of aquatic resources. This analysis was done qualitatively by reviewing the  
40 project description for construction activities that could alter surface topography or subsurface  
41 conditions such that nearby aquatic resources are impacted.

1 The analysis is presented in Impact BIO-51: *Substantial Adverse Effect on State- or Federally*  
2 *Protected Wetlands and Other Waters Through Direct Removal, Filling, Hydrological Interruption, or*  
3 *Other Means* in Section 13.3.3.5, *Impacts of the Project Alternatives on General Terrestrial Biological*  
4 *Resources*. Because DWR mapped all aquatic features within the delineation study area, the  
5 delineation also reflects all features that would be considered waters of the State. Therefore, the  
6 analyses and conclusions for effects in Section 13.3.3.4 under Impact BIO-51 would also apply to  
7 waters of the State.

## 8 **Methods Used to Assess Impacts on Terrestrial Wildlife Habitat Connectivity**

### 9 **Study Area**

10 Wildlife connectivity was evaluated qualitatively within the study area and at a larger landscape  
11 scale surrounding the study area to provide regional context for the connectivity setting within the  
12 study area and surrounding region. The landscape scale was qualitative in nature and encompassed  
13 a 25-mile area surrounding the study area.

### 14 **Methods**

15 To determine the existing conditions of wildlife connectivity and potential project-related impacts  
16 on wildlife and habitat connectivity in the study area, a literature review and assessment of wildlife  
17 connectivity resources and constraints was conducted. This wildlife connectivity assessment  
18 assembled current data and information related to wildlife movement including connectivity and  
19 barriers to wildlife movement within the study area to assess when and where the project could  
20 interfere with the movement of any native resident or migratory wildlife species, with established  
21 native resident or migratory wildlife corridor.

### 22 **Literature Review**

23 The literature, data, and aerial imagery review was conducted using the sources outlined below.

- 24 ● Google Earth
- 25 ● USGS 7.5-minute quadrangle maps
- 26 ● National Hydrography Dataset
- 27 ● CDFW's Biogeographic Information and Observation System (BIOS) Habitat Connectivity Viewer
- 28 ● CNDDDB for element occurrences
- 29 ● USFWS Information for Planning and Consultation (IPaC) tool
- 30 ● Wildlife-vehicle collision data
- 31 ● Priority wildlife movement barriers
- 32 ● Wildlife observations and movement data
- 33 ● Screening of the project's aquatic resources delineation dataset
- 34 ● Data regarding existing (as-built) drainage features and structures
- 35 ● Proposed project infrastructure improvements (e.g., new bridges, widen roads)
- 36 ● Traffic volumes and noise data

## 1 **Qualitative Connectivity Assessment**

2 The evaluation of wildlife connectivity was qualitative in nature and encompassed the areas that  
 3 existing terrestrial wildlife connectivity resources (i.e., wildlife corridors, linkages, riparian  
 4 corridors, habitat blocks) occur and provides regional context for the connectivity setting within the  
 5 study area. A qualitative landscape-scale approach was used to assess regional landscape features  
 6 and existing terrestrial wildlife connectivity resources and their potential to facilitate wildlife  
 7 movement for a variety of wildlife species inhabiting the project region.

8 To facilitate assessment of connectivity resources and their function and value as well as impacts on  
 9 species a wildlife guild approach was used to evaluate species as a function of guilds containing  
 10 species grouped based on similar behavioral, ecological, movement, and wildlife  
 11 crossing/infrastructure use characteristics. The Wildlife Crossing Guild approach (Kintsch and  
 12 Cramer 2011:13–14; Kintsch et al. 2015:3–12) was adapted for use in this analysis. This Wildlife  
 13 Crossing Guild approach facilitates the evaluation of movement and connectivity for a wide variety  
 14 of species within each guild and also facilitates the evaluation of impacts and design of structures  
 15 (such as culverts and bridges) based on ecological and behavioral attributes and requirements of  
 16 each particular Wildlife Crossing Guild (WCG).

17 Table 13-5 provides a summary of the WCGs used in the analysis and examples of locally occurring  
 18 species within each guild.

19 **Table 13-5. Summary of Terrestrial Wildlife Crossing Guilds and Example Species Used in the Analysis**

Wildlife Crossing Guild	General Attributes	Example Species Occurring in Study Area
Low-mobility small fauna	Small slow-moving species that require specific environmental conditions for dispersal and survival; may be corridor dwellers or passage species; may require some cover for dispersal and movement (i.e., vegetative cover and habitat contiguity)	Invertebrates, frogs, toads, salamanders
Semi-aquatic obligate	Generally, require aquatic and riparian habitat throughout life history, though may utilize terrestrial pathways for movements and dispersal; require some cover for dispersal and movement (i.e., vegetative cover and habitat contiguity)	River otter, mink, beaver, turtles
Moderate-mobility small fauna	Small species that are adaptable to various types of structures; require some cover for dispersal and movement (i.e., vegetative cover and habitat contiguity)	Squirrels ( <i>Otospermophilus sp.</i> and <i>Sciurus sp.</i> ), raccoon ( <i>Procyon lotor</i> ), badger ( <i>Taxidea taxus</i> ), weasels ( <i>Neovison sp.</i> , <i>Mustela sp.</i> , and <i>Martes sp.</i> ), and fox ( <i>Vulpes sp.</i> and <i>Urocyon sp.</i> ); may include some birds
Adaptive high-mobility fauna	Adaptable and highly mobile species that use a variety of structure types, which are proportional to body type; require some cover (i.e., vegetative cover and habitat contiguity)	Bobcat ( <i>Lynx rufus</i> ), coyote ( <i>Canis latrans</i> )
High-openness, high-mobility carnivores	Highly mobile species that tend to prefer good visibility; require some cover (i.e., vegetative cover and habitat contiguity)	Mountain lion

Wildlife Crossing Guild	General Attributes	Example Species Occurring in Study Area
Adaptive ungulates	Species that require good visibility on a horizontal plane (wide field of view) and moderate cover (i.e., vegetative cover and habitat contiguity); require taller and wider openings than the high-openness, high-mobility carnivores guild	Mule deer
Very high–openness fauna	Species requiring very wide fields of vision and line of sight; may require cover for dispersal and movement (i.e., vegetative cover and habitat contiguity)	San Joaquin kit fox
Aerial fauna	Species that fly and often require habitat contiguity and/or continuous canopy cover	Birds, bats, flying insects

1

2 This assessment also included consideration of topography (i.e., mountains, valleys, canyons,  
3 ridgelines), geography, land use (i.e., current and future), habitats, vegetation/land cover, water  
4 courses (i.e., perennial and intermittent), existing habitat linkages and wildlife crossings, and  
5 contiguity and connectivity between areas of open space (i.e., protected areas, undeveloped  
6 mountainous areas, greenbelts) within the study area and surrounding region (i.e., 25-mile  
7 landscape-scale study area).

8 In addition, species' ecological needs (e.g., access to food, water, shelter, cover) and behavior (e.g.,  
9 preferred habitat conditions and anti-risk behavior) were considered when assessing the landscape  
10 and potential connectivity structure and function. This qualitative landscape-scale assessment was  
11 used to inform baseline knowledge of existing wildlife movement conditions, including potential  
12 connectivity areas, crossing structures, pinch points, barriers, source-sink dynamics and potential  
13 project-related impacts.

14 The assessment reviewed and assessed the following conditions.

- 15 ● Identified wildlife corridors and linkages
- 16 ● Habitat and landscape features that connect natural habitat areas
- 17 ● Habitat and landscape features that facilitate connectivity structure or function
- 18 ● Existing crossings (e.g., wildlife crossings, culverts, bridges)

### 19 **Wildlife Connectivity Assessment**

20 Following desktop assessments, review and analysis of existing conditions and project alternatives  
21 details was evaluated to identify potential effects on existing connectivity, crossing function, and  
22 wildlife movement in the study area. Site-specific impacts on connectivity function and value were  
23 assessed and specific recommendations made to avoid, minimize, and mitigate for potential impacts  
24 (e.g., fragmentation, physical barriers, disturbance, light, and noise). These recommendations would  
25 be coordinated with DWR and resource agencies (as applicable) to ensure feasibility and  
26 congruence with other project elements. The analysis also includes discussions on existing  
27 regulatory context, descriptions of all available data on existing wildlife crossings, movement,  
28 corridors, and wildlife-vehicle collisions in the study area, and other connectivity resources in the  
29 study area.

## 1       **Methods Used to Assess Impacts on Conservation Plans**

2       The analysis of impacts on conservation plans (i.e., adopted HCPs, NCCPs, or other approved local,  
3       regional, or state HCPs) was limited to the conservation plans that overlapped with the study area  
4       and where permanent surface impacts of the project alternatives or creation and enhancement of  
5       wetlands under the CMP would occur. These plans include the SSHCP, SJC MSHCP, ECCC HCP/NCCP,  
6       and EACCS (Section 13.1.7, *Habitat Conservation Plans*). The Solano County Habitat Conservation  
7       Plan and Yolo Habitat Conservation Plan/Natural Community Conservation Plan overlapped with  
8       the study area, but no permanent surface impacts occurred within these conservation plan areas, so  
9       impacts on these plans were not analyzed further.

10       The analysis in this chapter considers the direct effects of project construction for each of the  
11       alternatives within the area that the study area overlaps the conservation plans. Permanent surface  
12       impacts from construction of the project alternatives within each conservation plan area were  
13       assessed quantitatively in GIS by overlaying the project alternative facility footprints on the  
14       conservation plan areas. Because the conservation plans have land preservation goals for different  
15       land cover types, impacts for each conservation plan were quantified for each natural community  
16       type covered by the plans. Classification of natural communities differed among plans, so natural  
17       community types were grouped within the land cover types used for project GIS analyses. A conflict  
18       would be considered significant if the permanent surface impacts of the project alternatives or  
19       creation and enhancement of wetlands under the CMP would prevent the conservation plans from  
20       meeting their habitat preservation goals.

21       The analysis also considered whether construction, operations, and maintenance of project  
22       alternatives and CMP would conflict with species and natural community conservation goals of the  
23       overlapping conservation plans. A conflict would be considered significant if the project alternatives  
24       would have significant impacts on species and natural communities covered by the conservation  
25       plans, after mitigation measures were applied.

## 26       **Methods Used to Assess Conflicts with Local Policies and Ordinances Protecting** 27       **Biological Resources**

28       The analysis of conflicts with local policies and ordinances was limited to those counties and cities  
29       where project facilities would be constructed, which includes Sacramento, San Joaquin, Contra  
30       Costa, and Alameda Counties, and the cities of Sacramento, Lodi, and Stockton. The analysis included  
31       a review of policies found in the respective general plans and ordinances in each jurisdiction that  
32       have goals and policies to protect biological resources and whether the construction of the  
33       alternatives would result in a potential conflict these goals and policies. A conflict would be  
34       considered significant if a project alternative would substantially inhibit any one of these  
35       jurisdictions from meeting the goals expressed in these policies and ordinances. Sources used for  
36       the analysis include the following plans and ordinances.

- 37       • Sacramento County General Plan of 2005–2030 (2011)
- 38       • *San Joaquin County General Plan* (2016)
- 39       • *Alameda County General Plan, Conservation Element* (1976)
- 40       • *Contra Costa County General Plan, 2005–2020* (2005)
- 41       • *City of Sacramento General Plan 2035* (2015)

- 1 • *City of Lodi General Plan (2010)*
- 2 • *Envision Stockton 2040 General Plan (2018)*
- 3 • Sacramento County Code, Title 19 *Trees*
- 4 • City of Sacramento City Code, 12.56 *Tree Planting, Maintenance, and Conservation*
- 5 • San Joaquin County Code, Chapter 9-1505 *Trees*; Chapter 9-1510 *Riparian Habitat*
- 6 • City of Stockton, Ordinance 117
- 7 • Alameda County Code, Chapter 12.11 *Regulation of Trees in County Right-of-Way*
- 8 • Contra Costa County Code, Chapter 816-6 *Tree Protection and Preservation*

## 9 **Methods Used to Assess Substantial Adverse Effects on Fish and Wildlife Resources**

### 10 **Regulated under California Fish and Game Code Section 1600 *et seq.***

11 To identify areas potentially regulated under California Fish and Game Code Section 1600 *et seq.*,  
12 project surface footprints and subsurface features for each alternative were assessed for overlaps  
13 with rivers, streams, and lakes. The rivers, streams, and lakes within the study area that could fall  
14 within a bed, bank, or channel of these features, include the following:

- 15 • Tidal perennial aquatic (meet definition of rivers and streams)
- 16 • Nontidal perennial aquatic (meet definition of streams and lakes)
- 17 • Tidal brackish emergent wetland (usually located within bed and bank of rivers)
- 18 • Tidal freshwater emergent wetland (usually located within bed and bank of rivers)
- 19 • Nontidal freshwater emergent wetland

20 Because the scope of California Fish and Game Code Section 1600 *et seq.* may include certain areas  
21 containing other communities associated with rivers, streams and lakes, the analysis also  
22 considered all landcover that occurs in or adjacent to these areas (referred to as associated  
23 communities). To capture valley/foothill riparian associated with Delta channels (rivers), a levee  
24 centerline GIS data set (California Department of Water Resources 2019) was used to establish the  
25 potential limit of regulated area (i.e., the top of bank). Aerial photographs (National Agriculture  
26 Imagery Program 2018) were used to assess for situations where valley/foothill riparian, extended  
27 beyond the levee centerline. Where these observations were made, the area potentially regulated  
28 was extended beyond the levee centerline to where a clear transition to another community type  
29 was discernable. All landcover to the presumed top of bank was included for the analysis. Where  
30 lakes and streams did not have associated levees, aerial imagery was relied upon (National  
31 Agriculture Imagery Program 2018) to estimate the top of bank, which for this assessment was  
32 determined to be the level at which a stream would begin to overflow into adjacent areas. Where the  
33 top of bank was not discernable in aerial photographs, aquatic types adjacent to the stream, river, or  
34 lake were included (e.g., nontidal freshwater emergent wetland) and valley/foothill riparian was  
35 included where contiguous with the river, stream, or lake.

36 The resulting layer of potentially regulated areas was then used to identify fish, wildlife, and plant  
37 resources that may be adversely affected by the proposed activities under each alternative. Special-  
38 status plants are not covered under California Fish and Game Code Section 1600 *t seq.*; however,  
39 they were also included in the analysis to support CDFW's review. Because the methods used may



1 have resulted in mapped areas that extend beyond CDFW jurisdiction under California Fish and  
2 Game Code Section 1600 *et seq* (e.g., including areas above tunnel segments that would be more  
3 than 100 feet below ground), the impacts presented in Impact BIO-56 are likely an overestimation of  
4 the effects on rivers, streams, and lakes associated communities, and species in occurring in these  
5 areas.

6 The following assumptions were used in the analysis.

- 7 • The potentially regulated areas considered were cut off downstream from the fish screens on  
8 the California Aqueduct and Delta-Mendota Canal.
- 9 • For the Bouldin Island and Roberts Island levee improvements, no tidal waters would be  
10 directly impacted.
- 11 • The location of the levee centerline for Bethany Reservoir was estimated because no GIS data  
12 sources were available.

### 13 **13.3.1.3 Evaluation of Operations**

14 The direct impacts from operations were largely addressed qualitatively, though they do rely on  
15 some numerical estimates, such as noise levels, and estimates of changes to concentrations of water  
16 quality constituents. Direct impacts from operations that were considered for analysis include the  
17 diversion of water from the Sacramento River and the use of facilities that support water diversion,  
18 including above ground SCADA and transmission lines. Diversions were evaluated for the potential  
19 to change water quality throughout the study area, which could affect wildlife species that utilized  
20 the study area's tidal channels and wetlands for habitat. The operation of project facilities could  
21 result in periodic disturbance to wildlife from human presence, noise, and lighting. Vehicles used by  
22 project personnel during operation could result in the disturbance of and injury or mortality of  
23 wildlife on project roads.

24 Changes in river flows, methylmercury, microcystins associated with cyanobacteria harmful algal  
25 blooms (CHABs), pesticides, and selenium, and their potential effects on species were assessed both  
26 qualitatively and quantitatively based on extrapolation from hydrologic and water quality modeling  
27 results (Chapter 5, *Surface Water*, and Chapter 9, *Water Quality*). These potential effects are based  
28 on surface water modeling results that were used to assess whether changes in flows could result in  
29 impacts on riparian species that depend on hydrogeomorphic processes to create and maintain  
30 suitable habitat; modeling results for selenium (water, fish tissue, and bird egg), methylmercury  
31 (water and fish tissue), and pesticides were used, along with a literature review of individual species  
32 or taxonomic groups' sensitivity to these bioaccumulative contaminants. The microcystins  
33 assessment utilized modeled temperature, velocity, and residence time, qualitative changes in  
34 nutrients and water clarity, as well as a literature review of microcystin impacts on terrestrial  
35 species, to determine whether the project alternatives could increase the potential frequency and  
36 magnitude of CHABs in the Delta, which could adversely affect terrestrial species (Chapter 9).  
37 Background information and specific analysis methods for each of the water quality constituents is  
38 detailed below.

## 39 **Hydrology**

40 Potential operational effects on natural communities and special-status species within the study  
41 area are considered in the analysis and rely on the hydrologic modeling data presented in Chapter 5,  
42 *Surface Water*.

1 As discussed in Chapter 3, *Description of the Proposed Project and Alternatives*, the project would not  
2 change operational criteria associated with upstream reservoirs. The SWP Oroville Reservoir and  
3 other upstream CVP reservoirs would continue to be operated to protect regulatory, environmental,  
4 and contractual obligations consistent with existing operations. However, the project may indirectly  
5 affect how others operate water storage and manage flows upstream of the study area.

6 The reservoir operations modeling presented in Chapter 5 was used to evaluate whether operating  
7 the project alternatives would indirectly affect habitats associated with reservoirs.

8 The upstream flow modeling on the Sacramento, Feather, and American Rivers presented in Chapter  
9 5 was used to evaluate whether operating the project alternatives would indirectly affect habitats  
10 associated with these upstream rivers.

## 11 **Methylmercury**

12 Mercury is a contaminant of concern that is transformed into the more bioavailable form of  
13 methylmercury under anoxic conditions in aquatic systems and is generally elevated throughout the  
14 Delta. The factors that determine if and how much mercury becomes mobilized into the foodweb are  
15 complex and dependent upon site-specific conditions. In general, the highest mercury methylation  
16 rates are associated with high tidal marshes that experience intermittent wetting and drying and  
17 associated anoxic conditions (Alpers et al. 2008:15). Increases in waterborne methylmercury that  
18 could occur in some areas would bioaccumulate in aquatic organisms that could, in turn, biomagnify  
19 in higher trophic levels and pose increased health risks to fish, wildlife, or humans. Chapter 9  
20 contains a detailed discussion of mercury in the study area. Methylmercury can also be transported  
21 to adjacent terrestrial foodwebs through consumption of aquatic invertebrates, and high  
22 concentrations of methylmercury have been reported in some bird species (Cristol et al. 2008:335;  
23 Ackerman et al. 2016:37).

24 The operational impacts of new flows with all project alternatives were analyzed to assess potential  
25 effects on mercury and methylmercury concentration and bioavailability, detailed in Chapter 9 and  
26 Appendix 9H, *Mercury*. Appendix 9H also contains applicable objectives for mercury and  
27 methylmercury in fish tissue. Largemouth bass was used as a surrogate species for analysis of  
28 impacts from changes in operations from the construction of the water conveyance facilities because  
29 they are good indicators of mercury contamination throughout the aquatic foodweb (Wood et al.  
30 2010:67). Largemouth bass have a relatively high level of mercury compared to other species, are  
31 piscivorous, are abundantly distributed throughout the Delta, and have high site fidelity. Therefore,  
32 they are representative of spatial patterns of tissue methylmercury concentrations throughout the  
33 aquatic foodweb and would reflect changes in methylmercury bioavailability resulting from the  
34 project. The magnitude of methylmercury bioaccumulation and its toxic effects on individuals differs  
35 among species and habitats due to differences in ecological factors, such as habitat type and  
36 foodweb structure, and biological factors, such as species sensitivity and exposure to other  
37 environmental stressors (Eagles-Smith et al. 2016:1216). Use of a single fish species has been  
38 documented to be a poor indicator of methylmercury concentrations in waterbirds that have broad  
39 foraging home ranges (Ackerman et al. 2014:63), so largemouth bass is not an accurate surrogate  
40 for actual methylmercury concentrations in terrestrial vertebrates. However, because  
41 methylmercury can be transported from aquatic to terrestrial foodwebs through consumption of  
42 aquatic prey (Cristol et al. 2008:335), modeled changes in aquatic foodweb methylmercury  
43 concentrations resulting from operation of all project alternatives, as modeled in largemouth bass,  
44 are assumed to result in similar changes in adjacent terrestrial foodwebs. Accordingly, modeled

1 largemouth bass methylmercury concentrations are used as a general indicator of expected changes  
2 to methylmercury bioavailability in Delta aquatic and adjacent terrestrial wetland habitats, which  
3 could affect special-status terrestrial species using these habitats.

#### 4 **Microcystins**

5 *Microcystis* is a toxic blue-green alga shown to have negative effects on the aquatic foodweb of the  
6 Delta (Brooks et al. 2012:612), with blooms generally occurring when water temperature is 19°  
7 Celsius or more and when conditions feature low channel velocities, long residence time, water  
8 clarity, and nutrient availability. These blooms typically form in the Delta from July through  
9 November (Lehman et al. 2020:4). Chapter 9 and Appendix 9E, *Cyanobacteria Harmful Algal Blooms*,  
10 include a detailed description of microcystins and the assessment methodology used in the Delta.  
11 *Microcystis* produces microcystins, which are a class of toxins that affect the livers of animals and  
12 humans; microcystins do not biomagnify, but can be transported through foodwebs through  
13 consumption (Moy et al. 2016:A). Poisoning of aquatic vertebrates such as fish, turtles, ducks, and  
14 waterbirds have been documented around the world, and high levels of microcystins have been  
15 identified in the tissues of mallards and double-crested cormorants, including gonads and eggs,  
16 indicating that microcystins may also affect bird reproduction (Chen et al. 2009:3317, 3320).  
17 Microcystins have also been found in terrestrial foodwebs, such as spiders and songbirds in riparian  
18 habitats, likely through consumption of emergent aquatic insects (Moy et al. 2016:A, E).

#### 19 **Pesticides**

20 Current use pesticides, including pyrethroids, organophosphates, carbamate insecticides, herbicides,  
21 and fungicides are used extensively throughout the Central Valley; legacy pesticides (i.e.,  
22 organochlorines and Group A pesticides) persist in the environment despite being banned from use  
23 in the United States in the 1970s through 1990s due to adverse health and environmental effects.  
24 Pesticides that target insect pests also have the potential to harm other organisms and can have  
25 toxic effects on the nervous systems of terrestrial species. Pesticides of concern in the study area are  
26 discussed in detail in Chapter 9.

27 Pesticides can impact special-status species through bioaccumulation in ingested prey items or  
28 indirectly through reduced availability of invertebrates that make up insectivorous species' diets.  
29 Project operation under all alternatives has the potential to affect pesticide concentrations within  
30 the Delta, which could in turn affect special-status species in these areas. Herbicides would be  
31 applied at CMP wetland creation and enhancement sites to remove nonnative vegetation for site  
32 preparation and to support establishment of new plantings. The analysis of pesticides and  
33 herbicides in Chapter 9 was used to evaluate impacts on terrestrial wildlife species.

#### 34 **Selenium**

35 Selenium is a constituent of concern in the lower San Joaquin River, the Delta, and San Francisco Bay  
36 with potential effects on aquatic and terrestrial biological resources, and indirectly, human health.  
37 Selenium is an essential nutrient for avian species and has a beneficial effect in low doses, such as  
38 binding to and reducing the toxicity of methylmercury (Scheuhammer 1987:277–278). However,  
39 selenium is bioaccumulative and higher concentrations can be toxic (Ackerman and Eagles-Smith  
40 2009:2134; Ohlendorf and Heinz 2011:670) and can lead to impaired reproduction, specifically,  
41 deformities in developing embryos, chicks, and adults, and can also result in embryo mortality  
42 (Ackerman and Eagles-Smith 2009:2134, 2139; Ohlendorf and Heinz 2011:690, 694). The effect of

1 selenium toxicity differs widely between species and also between age and sex classes within a  
2 species. In addition, the effect of selenium on a species can be confounded by interactions with the  
3 effects of other contaminants such as mercury (Ackerman and Eagles-Smith 2009:2140). Chapter 9  
4 contains a detailed discussion of selenium in the study area.

5 Selenium toxicity in wildlife species can result from the mobilization of naturally high  
6 concentrations of selenium in soils (Ohlendorf and Heinz 2011:670). The primary source of  
7 selenium bioaccumulation in birds is through their diet (Ackerman and Eagles-Smith 2009:2134;  
8 Ohlendorf and Heinz 2011:669) and selenium concentration in species differs by the trophic level at  
9 which they feed, increasing with trophic level, therefore, birds that consume prey with high levels of  
10 selenium have a higher risk of selenium toxicity (Ackerman and Eagles-Smith 2009:2139). The San  
11 Joaquin River watershed is the major source of selenium to the Delta, and the Sacramento River  
12 watershed has generally low selenium concentrations (Central Valley Regional Water Quality  
13 Control Board 1988:14). The U.S. Environmental Protection Agency developed recommended  
14 chronic aquatic life criteria for selenium in the Delta; relevant water quality criteria are discussed  
15 further in Appendix 9J, *Selenium*. Changes in selenium concentrations in water, fish tissue, and bird  
16 eggs were analyzed in Chapter 9. Generic bird egg selenium concentrations were modeled for insect-  
17 eating birds (e.g., mallards, shorebirds), and fish-eating birds (e.g., herons, terns) to represent  
18 different trophic levels (Appendix 9J). Modeled bird egg selenium concentrations were compared to  
19 Level of Concern (6 milligrams per kilogram dry weight [mg/kg dw]) and Toxicity Level (10 mg/kg  
20 dw) values from Beckon (2017:133).

#### 21 **13.3.1.4 Evaluation of Maintenance Activities**

22 Maintenance activities could result in periodic disturbances to natural communities and habitats  
23 and potential injury or mortality of special-status plants and wildlife.

- 24 ● Maintenance activities across all facilities would include repaving of access roads every 15  
25 years, semiannual general and ground maintenance (e.g., mowing, vegetation trimming,  
26 herbicide application), and daily or weekly inspections by vehicle.
- 27 ● Maintenance at the intakes (all project alternatives) would require scheduled routine or  
28 periodic adjustment and tuning to remain consistent with design intentions. Intake screens  
29 would be periodically cleaned. No dredging at intakes would be required.
- 30 ● Maintenance at the Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) would also  
31 include annual embankment repair, quarterly animal burrow filling, and quarterly weed  
32 management (e.g., mechanical removal and herbicide application).
- 33 ● Maintenance activities at the South Delta Outlet and Control Structure (Alternatives 1, 2a, 2b, 2c,  
34 3, 4a, 4b, and 4c) and Bethany Reservoir Surge Basin (Alternative 5) would also include annual  
35 cleaning (pressure washing).

36 A full description of maintenance activities including equipment used, duration, and frequency of  
37 activity is in Appendix 23B, *Air Quality and GHG Analysis Activity Data*.

#### 38 **13.3.1.5 Evaluation of Compensatory Mitigation**

39 CEQA requires an evaluation of potential impacts caused by the implementation of mitigation  
40 measures. Following the CEQA conclusion for each impact analyzed in Section 13.3.3, *Impacts and*

1 *Mitigation Approaches*, the potential impacts associated with implementing the CMP required to  
2 address potential impacts caused by the project are discussed.

3 The implementation of the project's CMP by DWR, which is mitigation for the project impacts that  
4 result in the loss of natural communities and species habitat, would result in the creation and  
5 enhancement of wetlands and other waters as well as habitat for special-status species on Bouldin  
6 Island and the I-5 ponds. Habitat restoration, enhancement, and protection actions (Appendix 3F,  
7 *Compensatory Mitigation Plan for Special-Status Species and Aquatic Resources*) would be  
8 implemented prior to or concurrent with the construction of the water conveyance facilities.  
9 Implementation of the CMP would result in physical changes to existing terrestrial biological  
10 resources.

11 For the analysis of the CMP impacts, natural communities and special-status species habitats that  
12 might be modified for restoration activities on Bouldin Island and the I-5 ponds were quantified  
13 using a GIS layer that included footprints for some types of restoration (Appendix 3F). The acreages  
14 of natural community and special-status species habitat types that would be removed by restoration  
15 were calculated, as were the acreages of natural community and special-status species types that  
16 would develop after restoration based on site attributes, such as vegetation types, soil types, and  
17 topography. Potential effects of periodic disturbance to wildlife from human presence, noise, and  
18 lighting were also included in the analysis of the CMP.

19 The CMP also includes a framework for channel margin enhancement and tidal wetland habitat  
20 creation (Appendix 3F, Section 3F.4.3, *Tidal Habitat Mitigation Framework*). Several priority  
21 locations for these activities are identified in the CMP, which were used to assess the potential for  
22 effects on terrestrial biological resources known to or having the potential to occur in these areas.  
23 The activities required for channel margin enhancements would generally include the removal of  
24 existing riprap, modification of the existing channel margin with heavy equipment, and placement of  
25 large woody debris on the channel margin. For tidal restoration, activities would include grading,  
26 creation of setback levees, planting, and breaching of existing levees. Impacts from these mitigation  
27 actions are described qualitatively in this Draft EIR.

28 In addition to the direct loss of natural communities and special-status species habitats associated  
29 with the restoration activities, changes in methylmercury, microcystins associated with  
30 cyanobacteria harmful algal blooms (CHABs), pesticides, and selenium, and their potential effects on  
31 species were assessed qualitatively based on extrapolation from water quality impact analysis  
32 (Chapter 9, *Water Quality*) and literature review of species' ecology and sensitivity to contaminants.  
33 Methods for these analyses are described in detail in Section 13.3.1.3, *Evaluation of Operations*.  
34 CEQA considerations may be necessary in the future when specific tidal restoration projects are  
35 proposed.

### 36 **13.3.1.6 Evaluation of Other Mitigation Measures**

37 CEQA requires an evaluation of potential impacts caused by the implementation of mitigation  
38 measures. Following the CEQA conclusion for each impact analyzed in Section 13.3.3, the potential  
39 impacts associated with implementing other mitigation measures required to address potential  
40 impacts caused by the project are analyzed. Table 4-1, in Chapter 4, *Framework for the*  
41 *Environmental Analysis*, lists the mitigation measures with potential to cause environmental impacts  
42 under CEQA. The potential impacts of implementing mitigation measures were evaluated for each  
43 natural community and special-status species by first identifying locations where other mitigation

1 measures could be implemented relative to each terrestrial biological resource. Where these  
2 locations overlap with modeled species habitat, potential impacts such as habitat loss, ground  
3 disturbance, noise, and visual disturbance were evaluated. If a potentially significant impact was  
4 identified, appropriate mitigation measures to reduce the impact to a less-than-significant level  
5 were identified. Mitigation impacts are considered in combination with project impacts in  
6 determining the overall impact conclusions for the project alternatives. Additional information  
7 regarding the analysis of mitigation measure impacts is provided in Chapter 4.

### 8 **13.3.2 Thresholds of Significance**

9 The project alternatives would be considered to have a significant impact under CEQA if it would  
10 result in any of the conditions listed below.

- 11 • Have a significant impact, either directly or through habitat modifications, on any species  
12 identified as a candidate, sensitive, or special-status species in local or regional plans, policies,  
13 or regulations, or by CDFW or USFWS.
- 14 • Have a significant impact on any riparian habitat or other sensitive natural community  
15 identified in local or regional plans, policies, regulations or by CDFW or USFWS.
- 16 • Have a significant impact on state or federally protected wetlands or waters (including, but not  
17 limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological  
18 interruption, or other means.
- 19 • Interfere substantially with the movement of any native resident or migratory fish or wildlife  
20 species or with established native resident or migratory wildlife corridors or impede the use of  
21 native wildlife nursery sites.
- 22 • Conflict with any local policies or ordinances protecting biological resources, such as a tree  
23 preservation policy or ordinance.
- 24 • Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state  
25 HCP.

### 26 **13.3.3 Impacts and Mitigation Approaches**

#### 27 **13.3.3.1 No Project Alternative**

28 As described in Chapter 3, *Description of the Proposed Project and Alternatives*, CEQA Guidelines  
29 Section 15126.6 directs that an EIR evaluate a specific alternative of “no project” along with its  
30 impact. The No Project Alternative in this Draft EIR represents the circumstances under which the  
31 project (or project alternative) does not proceed and considers predictable actions, such as projects,  
32 plans, and programs, that would be predicted to occur in the foreseeable future if the Delta  
33 Conveyance Project is not constructed and operated. This description of the environmental  
34 conditions under the No Project Alternative first considers how terrestrial biological resources  
35 could change over time and then discusses how other predictable actions could affect terrestrial  
36 biological resources.

#### 37 **Future Terrestrial Biological Resources Conditions**

38 For terrestrial biological resources, future conditions in 2040 are not anticipated to substantially  
39 change compared to existing conditions because land policies and resulting land uses that could

1 change the extent of natural communities and habitat for terrestrial species are not expected to  
2 change if the project (or project alternative) does not proceed. However, indirect impacts on  
3 terrestrial biological resources within the Delta may occur under the No Project Alternative as the  
4 result of changes in upstream hydrologic conditions, sea level rise, and continuing seismic risk to  
5 Delta levees (Delta Stewardship Council 2021a:2-9, 5-48-5-63). Also, changes in the quality of Delta  
6 water may occur as a result of sea level rise and upstream hydrologic conditions (Delta Stewardship  
7 Council 2021b:2-8, 4-56). Changes in water quality may affect crop production on agricultural lands  
8 used by some special-status wildlife for foraging and nesting (e.g., tricolored blackbird, greater  
9 sandhill crane) by reducing the quantity and quality of water suitable for irrigation (Delta  
10 Stewardship Council 2021a:5-34, 5-35). In addition, immediate, and potentially long-term changes  
11 in natural communities and species habitats could occur under the No Project Alternative because of  
12 seismic events, levee failure, and the inundation of Delta lands (Delta Stewardship Council 2021a:5-  
13 55). An analysis of the No Project Alternative effects on terrestrial biological resources at 2040 is  
14 presented in Appendix 13F, *Terrestrial Biological Resources 2040 Analysis*.

15 Impacts on terrestrial biological resources related to changes in land use by 2040 in the service area  
16 would be expected to continue at the current rate. While the extent of these impacts that might  
17 occur in any given region is uncertain, there is a broad range of impacts that could potentially occur  
18 as a result of the availability and cost of water. The availability of water as a result of changes in  
19 hydrology caused by climate change, either alone or in combination with other factors, could  
20 influence land uses in the SWP service area. As an example, reductions in the availability or  
21 increases in the cost of water supplies could result in temporary or permanent fallowing of  
22 cultivated agricultural land, including crops that some wildlife have become dependent on, such as  
23 alfalfa for Swainson's hawk and corn for sandhill cranes (Delta Stewardship Council 2021a:5-35).  
24 Similarly, a change in the availability of water supplies in combination with other factors (cost of  
25 living, environmental conditions such as air quality, capacity of transportation infrastructure to  
26 meet demand, etc.) could result in a change in the demand for previously planned commercial and  
27 residential developments. Current modeling suggests such changes could also result in growth  
28 within the regions redirecting toward infill or other actions to address the demand for housing and  
29 supporting commercial development (Delta Stewardship Council 2021c:2-13-2-16), which could  
30 benefit terrestrial biological resources by slowing the loss of natural communities and habitats to  
31 development.

## 32 **Predictable Actions by Others**

33 A list and description of actions included as part of the No Project Alternative are provided in  
34 Appendix 3C, *Defining Existing Conditions, No Project Alternative, and Cumulative Impact Conditions*.  
35 As described in Chapter 4, *Framework for the Environmental Analysis*, the No Project Alternative  
36 analyses focus on identifying the additional water supply-related actions public water agencies may  
37 opt to follow if the Delta Conveyance Project does not occur.

38 Public water agencies participating in the Delta Conveyance Project have been grouped into four  
39 geographic regions. The water agencies within each geographic region would likely pursue a similar  
40 suite of water supply projects under the No Project Alternative (Appendix 3C). Construction of  
41 water supply reliability projects would result in ground-disturbing activities that could impact  
42 terrestrial biological resources. Table 13-6 provides a summary of the potential impacts from the  
43 likely projects under the No Project Alternative.

1 **Table 13-6. Effects on Terrestrial Biological Resources from the Plans, Policies, and Programs for the**  
 2 **No Project Alternative**

Project Type	Regions	Potential Construction Effects on Terrestrial Biological Resources	Potential Operational Effects on Terrestrial Biological Resources
Increased/accelerated desalination	Northern coastal, southern coastal	Impacts on special-status species, which includes habitat loss and fragmentation, injury, mortality, and disruption of normal behaviors; impacts on jurisdictional aquatic resources.	No impacts anticipated.
Water recycling	Northern coastal, northern inland, southern coastal, southern inland	Impacts on special-status species, which includes habitat loss and fragmentation, injury, mortality, and disruption of normal behaviors; impacts on jurisdictional aquatic resources.	No impacts anticipated.
Groundwater management	Northern coastal, southern coastal	Impacts on special-status species, which includes habitat loss and fragmentation, injury, mortality, and disruption of normal behaviors; impacts on jurisdictional aquatic resources.	No impacts anticipated.
Groundwater recovery (brackish water desalination)	Northern inland, southern coastal, southern inland	Impacts on special-status species, which includes habitat loss and fragmentation, injury, mortality, and disruption of normal behaviors; impacts on jurisdictional aquatic resources.	Pumping activities could result in impacts on aquatic habitats for special-status species and jurisdictional aquatic resources by reducing the amount of groundwater supporting these habitats.
Water use efficiency measures	Northern coastal, northern inland, southern coastal, southern inland	No impacts anticipated.	No impacts anticipated.

3  
 4 Desalination projects would most likely be pursued in the northern and southern coastal regions.  
 5 The southern coastal regions would likely require larger and more desalination projects than the  
 6 northern coastal region to replace the water yield that otherwise would have been received through  
 7 the Delta Conveyance Project as well other contributing factors, such as differences in local  
 8 hydrology and climate. These projects would be sited near the coast and could involve disturbance  
 9 of natural communities and agricultural lands that provide habitat for special-status species.  
 10 Groundwater recovery (i.e., brackish water desalination) would involve similar types of ground  
 11 disturbance but could occur across the northern inland, southern coastal, southern inland regions  
 12 and in both coastal and inland areas, such as the San Joaquin Valley. Grading and excavation at the  
 13 desalination and groundwater recovery plant sites would be necessary for construction of  
 14 foundations, and trenching would occur for installation of water delivery pipelines and utilities,  
 15 which could impact natural communities and agricultural lands that provide habitat for special-  
 16 status species and result in direct impacts on species through removal of special-status plant  
 17 populations and injury, mortality, and disruption of normal behaviors of special-status wildlife.



1 The northern and southern coastal regions are also most likely to explore constructing groundwater  
2 management projects. The southern coastal region would likely require more projects than the  
3 northern coastal region under the No Project Alternative. Groundwater management projects would  
4 occur in association with an underlying aquifer but could occur in a variety of locations.  
5 Construction activities for each project could require excavation for the construction of the recharge  
6 basins, conveyance canals, and pipelines and drilling for the construction of recovery wells (with  
7 completion intervals between approximately 200 and 900 feet below ground surface). Construction  
8 activities would include site clearing; excavation and backfill; and construction of basins,  
9 conveyance canals, pipelines, pump stations, and the turnout. Grading activities associated with the  
10 construction of recharge basins would involve earthmoving, excavation, and grading. Canals and  
11 pipelines would likely be constructed using typical open trench construction methods. In some cases  
12 where siphons would be installed, jack and bore methods could be used to tunnel under and avoid  
13 disruption of surface features. These activities would potentially result in the disturbance of natural  
14 communities and agricultural areas that potentially support special-status species.

15 Water recycling projects could be pursued in all four regions. The northern inland region would  
16 require the fewest number of wastewater treatment/water reclamation plants, followed by the  
17 northern coastal region, and then by the southern coastal region. The southern inland region would  
18 require the greatest number of water recycling projects to replace the anticipated water yield that it  
19 otherwise would have received through the Delta Conveyance Project. These projects would be  
20 located near water treatment facilities. Construction techniques for water recycling projects would  
21 vary depending on the type of project (e.g., for landscape irrigation, groundwater recharge, dust  
22 control, industrial processes) but could require earthmoving activities, grading, excavation, and  
23 trenching. Because construction would involve ground-disturbing activities, such actions could  
24 result in the disturbance of natural communities and agricultural areas that potentially support  
25 special-status species. In the southern inland region where a greater number of projects would be  
26 needed as a substitute for Delta Conveyance, the potential for impact would also be greatly  
27 increased relative to these projects in the presence of Delta Conveyance.

28 Water efficiency projects could be pursued in all four regions and involve a wide variety of project  
29 types, such as flow measurement or automation in a local water delivery system, lining of canals, use  
30 of buried perforated pipes to water fields, and additional detection and repair of commercial and  
31 residential leaking pipes. These projects could occur anywhere in the regions and most would  
32 involve little ground disturbance or would occur in previously disturbed areas.

33 As detailed above, all project types across all regions would involve relatively typical construction  
34 techniques (i.e., no large-scale tunnels or deep soil mixing) and would be required to conform with  
35 the requirements of CEQA and/or state and local regulations protecting terrestrial biological  
36 resources, and mitigation measures would be developed to protect these resources, such as  
37 requiring biological monitoring, implementing avoidance and minimization measures for sensitive  
38 biological resources, and compensating for the loss of special-status species habitats and  
39 jurisdictional aquatic resources.

### 13.3.3.2 Impacts of the Project Alternatives on Sensitive Natural Communities

Eight of the eleven natural community types occurring in the study area are identified as special-status natural communities. These communities are considered special status because they include specific vegetation alliances that are recognized by CDFW as being of limited distribution statewide or within a county or region (CNDDDB Rank of S1–S3) or because they require focused analysis under federal and state laws and regulations (Section 13.2, *Applicable Laws, Regulations, and Programs*). Impacts would be considered significant if they have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS. In this analysis, a *substantial adverse effect* on a sensitive natural community is defined as a net loss of habitat function, including a net loss of acreage.

The three remaining natural community types are not discussed under this section. Tidal brackish emergent wetlands would not be affected because the project alternatives would be implemented within freshwater portions of the tidal Delta. The grassland community mapped in the study area generally would not be considered a special-status natural community because, as described in Section 13.1.2.2, *Natural Community Descriptions*, it is generally dominated by nonnative species and includes areas of fallow and disturbed fields. It may contain vegetation alliances that are recognized by CDFW as sensitive, but the vegetation mapping available for this analysis does not have the resolution required to identify those alliances, which typically require on-the-ground surveys to identify. Other seasonal wetlands do not contain specific vegetation alliances that are recognized by CDFW as being of limited distribution statewide or within a county or region and so are addressed in other sections of this document where they are components of sensitive wildlife habitat or are regulated wetlands.

Methods for determining impacts on sensitive natural communities are presented in Section 13.3.1, *Methods for Analysis*.

#### Impact BIO-1: Impacts of the Project on the Tidal Perennial Aquatic Natural Community

##### *All Project Alternatives*

##### Construction

Constructing the water conveyance facilities would permanently and temporarily eliminate areas of the tidal perennial aquatic natural community. Permanently affected lands would no longer be available as plant and wildlife habitat. Impacts would result primarily from constructing the intake structures and constructing the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c). Alternative 5 would have fewer impacts than the other alternatives, with most permanent impacts associated with the intake structures and most temporary impacts associated with geotechnical investigations. Affected acreages of tidal perennial aquatic habitat that would be permanently or temporarily lost by implementing the project alternatives are summarized in Table 13-7 and are shown in Mapbooks 13-1–13-3. In general, Alternatives 2a and 4a would have the largest effect on tidal perennial aquatic natural habitat. These two alternatives have greater impacts associated with the outlet and control structures, and the use of Intake A. Alternative 5 has the fewest impacts because it does not include the Southern Complex. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:

1 *Construction Best Management Practices for Biological Resources* (Appendix 3B, *Environmental*  
 2 *Commitments and Best Management Practices*) would reduce these potential impacts by training  
 3 construction staff on the needs of protecting sensitive biological resources, reporting requirements,  
 4 and the ramifications for not following these measures; by implementing spill prevention and  
 5 containment plans that would avoid material spills that could affect aquatic habitat; and by having a  
 6 biological monitor present to ensure that non-disturbance buffers and associated construction  
 7 fencing are intact and all other protective measures are being implemented where applicable.

8 **Table 13-7. Impacts<sup>a</sup> on the Tidal Perennial Aquatic Natural Community by Alternative**

Alternative	Permanent Impacts (acres)	Long-Term Temporary Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres affected)
1	36.76	4.73	13.17	54.66
2a	45.84	8.42	13.17	67.43
2b	33.61	4.28	12.92	50.81
2c	35.57	4.68	13.17	53.42
3	33.15	4.73	5.44	43.32
4a	42.73	8.42	5.44	56.59
4b	30.50	4.28	5.20	39.98
4c	32.46	4.65	5.43	42.54
5	5.87	1.10	4.16	11.13

9 <sup>a</sup> See Section 13.3.1.2, *Evaluation of Construction Activities*, for definition of impact types.

10 Field investigations would be conducted prior to and during construction under all project  
 11 alternatives to more specifically identify appropriate construction methods and design criteria  
 12 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
 13 existing utilities, and address the establishment of geological and groundwater monitoring  
 14 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
 15 would involve a variety of ground-disturbing activities that would vary in duration from several  
 16 hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
 17 Construction Authority 2022a, 2022b) and some of which would involve in-water boring in tidal  
 18 perennial aquatic habitat (Section 3.15). Geotechnical investigations associated with the tunnels for  
 19 all project alternatives, which include CPTs and soil borings, would result in temporary impacts on  
 20 tidal perennial aquatic habitat (Appendix 13C, *Impact Tables*). The West Tracy Fault Study and the  
 21 Bethany Fault Study investigations, pilot studies for settlement, agronomic testing, and utility  
 22 potholing would not occur in tidal perennial aquatic habitat. Pile installation test methods at the  
 23 north Delta intakes would temporarily affect tidal perennial aquatic habitat; however, this  
 24 temporary impact is not characterized as an additional loss of habitat because impacts for these  
 25 locations have already been quantified within the construction footprint. Environmental  
 26 Commitments EC-1: *Conduct Worker Awareness Training*, EC-2: *Develop and Implement Hazardous*  
 27 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
 28 *Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
 29 (Appendix 3B) would reduce these potential impacts by training construction staff on the needs of  
 30 protecting sensitive biological resources, reporting requirements, and the ramifications for not  
 31 following these measures; by implementing spill prevention and containment plans that would  
 32 avoid material spills that could affect the viability of aquatic habitat; and by having a biological  
 33 monitor present to ensure that all other protective measures are being implemented where  
 34 applicable.

1        Operations

2        As discussed in Chapter 5, *Surface Water*, project operations would not substantially alter river  
3        flows on the Sacramento and San Joaquin Rivers. Therefore, project operations would not  
4        substantially affect the tidal perennial aquatic natural community.

5        Maintenance

6        Though maintenance activities would take place in existing/developed facilities and would not affect  
7        the tidal perennial aquatic natural community, some activities may occur adjacent to the tidal  
8        perennial aquatic community and could result in inadvertent impacts related to repaving of access  
9        roads every 15 years and semiannual general and ground maintenance (e.g., mowing, vegetation  
10       trimming, herbicide application). These activities also create the potential for runoff of paving  
11       material or materials from parked vehicles or staging areas.

12       **CEQA Conclusion—All Project Alternatives**

13       The project alternatives would cause the removal, conversion, and temporary disturbance of tidal  
14       perennial aquatic natural community due to project construction and maintenance.

15       The temporary disturbances of tidal perennial aquatic habitat would be reduced by Environmental  
16       Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
17       *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
18       *Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
19       (Appendix 3B). Even with these environmental commitments, however, the loss of tidal perennial  
20       aquatic community from construction and potential impacts from maintenance activities would be  
21       significant. Mitigation Measure CMP: *Compensatory Mitigation Plan* would offset permanent and  
22       temporary loss of tidal perennial aquatic habitat. Therefore, the impacts on the tidal perennial  
23       aquatic community from the project alternatives would be less than significant with mitigation.

24       **Mitigation Measure CMP: Compensatory Mitigation Plan**

25       The CMP identifies compensatory mitigation options to address impacts on sensitive natural  
26       communities, habitat for special-status species, and wetlands and other waters (“aquatic  
27       resources”) from the construction and operation of the project. The final compensatory habitat  
28       mitigation needs for the project will be determined once all regulatory permits and approvals  
29       are secured. The CMP outlines three primary approaches in providing compensatory mitigation  
30       to mitigate impacts associated with the construction and operation of the project alternatives,  
31       which include the following.

- 32       1. Develop and implement several initial mitigation actions on Bouldin Island and at the I-5  
33       ponds that would provide compensatory mitigation for many of the affected natural  
34       communities, special-status species, and aquatic resources.
- 35       a. The proposed compensatory mitigation actions to be undertaken on Bouldin Island  
36       would retain agricultural land uses in most locations, preserve existing habitat, and  
37       create or enhance new habitat in areas where it could be sustained with little  
38       maintenance. The Bouldin Island mitigation sites would support multiple habitat types,  
39       including freshwater marsh, seasonal wetland, riparian, grasslands, ponds  
40       (depressions), and grasslands.

- 1           b. The proposed compensatory mitigation actions to be undertaken at the I-5 ponds  
2           include reconfiguring the three ponds to create a mosaic of high-quality, low-  
3           maintenance freshwater emergent wetland, open-water, and associated natural  
4           habitats. In addition, existing riparian habitat would be preserved to the extent feasible.
- 5           2. Use existing or proposed mitigation banks to secure credits for certain types of habitats and  
6           natural communities and to use site protection instruments, such as conservation  
7           easements, to protect and manage agricultural lands for wildlife foraging or roosting habitat.
- 8           3. Propose a mitigation framework under which future tidal wetland restoration and channel  
9           margin enhancement would be done. Mitigation sites would provide suitable habitat for  
10          affected fisheries, including salmonids, delta smelt, longfin smelt, and green sturgeon.
- 11          c. The restoration of tidal wetlands is intended to contribute to at-risk fish species  
12          recovery, providing improved foraging opportunities and refuge from predators. Tidal  
13          wetland habitat mitigation would generally be achieved at suitable locations by  
14          reconnecting former wetland areas to adjacent tidal sloughs and rivers. Restoration  
15          would primarily occur through breaching or setback of levees, thereby restoring tidal  
16          fluctuation to land parcels currently isolated behind those levees. Where practicable and  
17          appropriate, portions of restoration sites will be raised to elevations that will support  
18          tidal marsh vegetation following levee breaching. Potential areas for restoration would  
19          be within the lower Yolo Bypass and Cache Slough Complex.
- 20          d. Channel margin enhancements would seek to improve rearing and outmigration habitat  
21          for juvenile salmonids along migration corridors that have been degraded by  
22          construction of flood protection levees. Channel margin restoration would be  
23          accomplished by improving channel geometry and restoring riparian, marsh, and  
24          mudflat habitats on the water side of levees along channels. Enhancement sites would  
25          be targeted within the same general geography of the project, including the north Delta  
26          along the Sacramento River mainstem, north Delta along Sacramento River tributaries  
27          (e.g., Steamboat, Sutter, and Elk Sloughs), lower Yolo Bypass, and Cache Slough Complex.

28          Compensatory mitigation for aquatic resources would be provided in accordance with the  
29          procedures set forth in 33 CFR Section 332.3(b) and would be provided for through either  
30          mitigation bank credits or permittee-responsible mitigation under a watershed approach.  
31          Compensatory mitigation for impacts on nontidal freshwater perennial emergent wetlands,  
32          valley/foothill riparian wetlands, nontidal perennial aquatic, and other seasonal wetlands would  
33          be located on Bouldin Island. Compensatory mitigation for vernal pools and alkaline wetlands  
34          would be provided through purchasing wetland creation credits at an approved mitigation bank  
35          and in the instance that bank credits are not available, a non-bank site approved by the relevant  
36          regulatory agencies supporting the necessary habitat would be used as mitigation.  
37          Compensatory mitigation for tidal freshwater emergent wetlands and tidal perennial aquatic  
38          communities would be provided by the proposed Tidal Habitat Mitigation Framework  
39          (Appendix 3F, *Compensatory Mitigation Plan for Special-Status Species and Aquatic Resources*,  
40          Section 3F.4.3, *Tidal Habitat Mitigation Framework*). A secondary option that may be used is the  
41          purchase of wetland creation credits at an approved mitigation bank.

42          As mentioned above, under the CMP tidal perennial aquatic habitat would be created or  
43          acquired and permanently protected to compensate for project impacts and ensure no  
44          significant loss of tidal perennial aquatic habitat functions and values (Appendix 3F, Section

1 3F.3.2.5, *Tidal Wetlands and Waters*, and Attachment 3F.1, *Compensatory Mitigation Design*  
2 *Parameters*, Table 3F.1-2, CMP-1: *Tidal Perennial Aquatic Habitat*).

### 3 ***Mitigation Impacts***

4 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
5 mitigation measure impacts. The analyses below consider the potential impacts associated with  
6 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
7 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
8 *Measures*.

### 9 *Compensatory Mitigation*

10 Implementing the CMP on Bouldin Island and at the I-5 ponds would not result in the permanent  
11 loss of tidal perennial aquatic habitat (Appendix 13C, Table 13C-20). The creation and enhancement  
12 of wetlands and other waters as well as habitat for special-status species under the project's CMP  
13 would result in temporary impacts on the tidal perennial aquatic community from channel margin  
14 enhancement and tidal restoration.

15 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
16 enhancement (Appendix 3F, Section 3F.3.2.4, *Vernal Pools and Alkaline Wetlands*), these activities  
17 would not result in effects on tidal perennial aquatic because they would not likely occur within or  
18 adjacent to this community. Site-specific analyses are not provided because locations of potential  
19 non-bank sites are not currently known.

20 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
21 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
22 management of agricultural areas but may also include natural communities in the study area  
23 (Appendix 3F, Section 3F.4.2.2, *Site Protection Instruments*, Attachment 3F.1, Table 3F.1-3, CMP-18a:  
24 *Sandhill Crane Roosting Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's*  
25 *Hawk Nesting Habitat*, CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird*  
26 *Nesting Habitat*, and CMP-22b: *Tricolored Blackbird Foraging Habitat*). These activities would not  
27 result in effects on tidal perennial aquatic relative to baseline conditions because agricultural  
28 practices on these properties would continue as they currently do and the protection of natural  
29 communities would not likely result in any impacts on the tidal perennial aquatic community in the  
30 study area. Site-specific analyses are not provided because locations of potential protection  
31 instruments are not currently known.

32 The CMP and site-specific permitting approvals would ensure that there is no significant loss of  
33 habitat or habitat value by adjusting the overall mitigation commitment (Appendix 3F, Section 3F.1,  
34 *Introduction*, Section 3F.2.4, *Mitigation Design Parameters*, and Attachment 3F.1, Table 3F.1-2, CMP-  
35 0: *General Design Guidelines*) and therefore would reduce any habitat losses associated with the CMP  
36 to less than significant. The activities to enhance channel margins would generally include the  
37 removal of existing riprap, modification of the existing channel margin with heavy equipment, and  
38 placement of large woody debris on the channel margin. Tidal restoration activities would include  
39 grading, creation of setback levees, planting, and breaching of existing levees. Environmental  
40 Commitments EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*  
41 and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would  
42 reduce the potential for discharge of construction materials in aquatic resources.

1 The impacts on tidal perennial aquatic habitat from the project alternatives with the CMP would be  
2 less than significant with mitigation.

### 3 Other Mitigation Measures

4 Some mitigation measures would involve ground disturbance and the use of heavy equipment that  
5 would have the potential to result in loss of areas of tidal perennial aquatic natural community from  
6 ground disturbance, movement of construction vehicles, or inadvertent discharge of construction-  
7 related fluids such as fuels, oils, and cement. Impacts on the tidal perennial aquatic natural  
8 community resulting from implementation of mitigation measures would be much less substantial,  
9 but similar to construction effects of the project alternatives in certain construction areas and would  
10 contribute to tidal perennial aquatic natural community impacts.

11 The impacts of habitat loss, ground disturbance, and exposure to hazardous materials on the tidal  
12 perennial aquatic natural community would be reduced through the CMP and Environmental  
13 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
14 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
15 *Countermeasure Plans*; EC-4a: *Develop and Implement Erosion and Sediment Control Plans*; EC-4b:  
16 *Develop and Implement Stormwater Pollution Prevention Plans*; and EC-14: *Construction Best*  
17 *Management Practices for Biological Resources*. Additionally, Mitigation Measure BIO-2a: *Avoid or*  
18 *Minimize Impacts on Special-Status Natural Communities and Special-Status Plants* would reduce  
19 impacts on the tidal perennial aquatic natural community. Therefore, impacts on the tidal perennial  
20 aquatic natural community from implementation of other mitigation measures would be reduced to  
21 less than significant.

22 Overall, the impacts on the tidal perennial aquatic natural community from construction of  
23 compensatory mitigation and implementation of other mitigation measures, combined with project  
24 alternatives, would still be less than significant with mitigation.

## 25 **Impact BIO-2: Impacts of the Project on Tidal Freshwater Emergent Wetlands**

### 26 ***All Project Alternatives***

#### 27 Construction

28 Project construction would permanently and temporarily eliminate areas of tidal freshwater  
29 emergent wetlands and associated vegetation types. Permanently affected lands would no longer be  
30 available as plant and wildlife habitat. Affected acreages of tidal freshwater emergent wetlands that  
31 would be permanently or temporarily lost by implementing the project alternatives are summarized  
32 in Table 13-8 and are shown in Mapbooks 13-1–13-3. In general, the central alignment alternatives  
33 (Alternatives 1, 2a, 2b, and 2c) would have a greater effect on tidal freshwater emergent wetlands  
34 than the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and the Bethany Reservoir  
35 alignment alternative (Alternative 5). The difference between the acreages affected by the three  
36 alignments is because these impacts would occur at different locations. Most of the impacts would  
37 result from geotechnical investigations and constructing roads and power transmission lines.  
38 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
39 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
40 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
41 *Biological Resources* (Appendix 3B) would reduce these potential impacts by training construction  
42 staff on the needs of protecting sensitive biological resources, reporting requirements, and the

1 ramifications for not following these measures; by implementing spill prevention and containment  
 2 plans that would avoid material spills that could affect wetland habitat; and by having a biological  
 3 monitor present to ensure that non-disturbance buffers and associated construction fencing are  
 4 intact and all other protective measures are being implemented where applicable.

5 **Table 13-8. Impacts <sup>a</sup> on the Tidal Freshwater Emergent Wetland Natural Community by**  
 6 **Alternative**

Alternative	Permanent Impacts (acres)	Long-Term Temporary Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
1	0.23	0.00	0.82	1.05
2a, 2b, 2c	0.05	0.00	0.82	0.87
3, 4a, 4b, 4c	0.03	0.00	0.37	0.40
5	0.18	0.00	0.39	0.57

7 <sup>a</sup> See Section 13.3.1.2, *Evaluation of Construction Activities*, for definition of impact types.

8 Field investigations would be conducted prior to and during construction under all project  
 9 alternatives to more specifically identify appropriate construction methods and design criteria  
 10 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
 11 existing utilities, and address the establishment of geological and groundwater monitoring  
 12 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
 13 would involve a variety of ground-disturbing activities that would vary in duration from several  
 14 hours to approximately 6 weeks (Section 3.15; Delta Conveyance Design and Construction Authority  
 15 2022a, 2022b) and would involve some in-water boring that could affect tidal freshwater emergent  
 16 wetlands (Section 3.15). Geotechnical investigations associated with the tunnels for all project  
 17 alternatives, which include CPTs and soil borings, would result in temporary impacts on tidal  
 18 freshwater emergent wetlands (Appendix 13C). The West Tracy Fault Study and the Bethany Fault  
 19 Study investigations, pilot studies for settlement, agronomic testing, and utility potholing would not  
 20 occur in tidal freshwater emergent wetland habitat. The following field investigations would be  
 21 conducted within proposed surface construction footprints of project facilities (including portions of  
 22 tunnel alignments), and would temporarily affect tidal emergent wetlands: test trenches, CPTs, soil  
 23 borings, electrical resistivity tomography, groundwater testing and monitoring, and monument  
 24 installation. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop*  
 25 *and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
 26 *Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
 27 *Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts. These  
 28 environmental commitments effectively reduce impacts by (1) minimizing locating test trenches,  
 29 CPTs, and borings in aquatic features, to the extent possible, in areas where there would be no  
 30 additional surface disturbance during construction; (2) training construction staff on the needs of  
 31 protecting sensitive biological resources, reporting requirements, and the ramifications for not  
 32 following these measures; (3) implementing spill prevention and containment plans that would  
 33 avoid material spills that could affect the viability of aquatic habitat; and (4) having a biological  
 34 monitor present to ensure that all other protective measures are being implemented where  
 35 applicable.



1        Operations

2        As discussed in Chapter 5, *Surface Water*, project operations would not substantially alter river  
3        flows on the Sacramento and San Joaquin Rivers. Therefore, project operations would not  
4        substantially affect tidal freshwater emergent wetlands.

5        Maintenance

6        Though maintenance activities would take place in existing/developed facilities, some activities may  
7        occur adjacent to tidal freshwater emergent wetlands and could result in inadvertent impacts  
8        related to repaving of access roads every 15 years and semiannual general and ground maintenance  
9        (e.g., mowing, vegetation trimming, herbicide application). These activities also create the potential  
10       for runoff of paving material or materials from parked vehicles or staging areas.

11       **CEQA Conclusion—All Project Alternatives**

12       The project alternatives would cause the removal, conversion, and temporary disturbance of tidal  
13       freshwater emergent wetlands due to project construction and maintenance.

14       Temporary disturbances and indirect impacts on tidal freshwater emergent wetlands would be  
15       reduced by Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop*  
16       *and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
17       *Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
18       *Practices for Biological Resources*. Even with these environmental commitments, however, the loss of  
19       tidal freshwater emergent wetlands from construction and potential impacts from maintenance  
20       activities would be significant. Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-*  
21       *Status Natural Communities and Special-Status Plants* would reduce impacts on tidal freshwater  
22       emergent wetlands during project construction. Mitigation Measure BIO-2b: *Avoid and Minimize*  
23       *Impacts on Terrestrial Biological Resources from Maintenance Activities* would reduce impacts on  
24       tidal freshwater emergent wetland during project maintenance. Mitigation Measure BIO-2c:  
25       *Electrical Power Line Support Placement* would minimize impacts on tidal freshwater emergent  
26       wetlands from electric power line installation. Mitigation Measure CMP: *Compensatory Mitigation*  
27       *Plan* would offset permanent and temporary loss of tidal freshwater emergent wetland. Therefore,  
28       the impacts on tidal freshwater emergent wetland from the project alternatives would be less than  
29       significant with mitigation.

30       **Mitigation Measure BIO-2a: Avoid or Minimize Impacts on Special-Status Natural**  
31       **Communities and Special-Status Plants**

32       DWR will evaluate all project activities for their impacts on special-status natural communities  
33       and special-status plants and avoid or minimize impacts on special-status natural communities  
34       and special-status plants that occur on project sites. Diamond-petaled California poppy and  
35       caper-fruited tropidocarpum, which are quite rare and on the verge of extinction, will be  
36       avoided. Impacts on other special-status plant species will be avoided to the extent feasible.

37       DWR will conduct preconstruction surveys for special-status natural communities and special-  
38       status plants within and adjacent to all project sites in areas of potential suitable habitat, as  
39       identified in the habitat models. The purposes of these surveys will be to (1) identify and map  
40       any special-status natural communities present, (2) determine whether the locations of special-  
41       status plants identified in previous record searches or surveys are extant, (3) identify any new

1 special-status plant occurrences, (4) cover any portions of the study area not previously  
2 surveyed, and (5) identify where mitigation measures would be implemented to avoid or offset  
3 impacts. The extent of mitigation for direct loss of or indirect effects on special-status plants will  
4 be based on these survey results.

5 All surveys for special-status natural communities and special-status plants will be conducted  
6 by qualified biologists following *Guidelines for Conducting and Reporting Botanical Inventories*  
7 *for Federally Listed, Proposed and Candidate Plants* (U.S. Fish and Wildlife Service 1996) and  
8 *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and*  
9 *Sensitive Natural Communities* (California Department of Fish and Wildlife 2018b:1–12), or the  
10 most current versions of these protocols. The surveys will be floristic in nature and conducted in  
11 a manner that maximizes the likelihood of locating special-status plant species or special-status  
12 natural communities that may be present (i.e., during the appropriate season and at an  
13 appropriate level of ground coverage). Locations of special-status plants in construction areas  
14 will be recorded using a GPS unit and flagged.

### 15 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 16 **Resources from Maintenance Activities**

17 DWR will implement the following process and measures to avoid and minimize potential  
18 impacts on terrestrial biological resources when maintenance activities occur at DWR project  
19 facilities. Consistent with current DWR environmental clearance review procedures, DWR will  
20 implement the following measures to avoid and minimize impacts on sensitive species, sensitive  
21 natural communities, and sensitive vegetation alliances during project maintenance activities, to  
22 the greatest extent practicable. Additional measures may be developed for site-specific  
23 conditions or specific biological resources and implemented, as necessary. If additional permits  
24 and approvals are determined to be necessary through the environmental clearance review,  
25 then the conditions of those permits and approvals will supersede the measures listed below.

- 26 1. Prior to the start of maintenance activities, DWR environmental staff will conduct an  
27 environmental review of the potential for maintenance to impact sensitive resources. Using  
28 occurrence databases, aerial imagery, and prior knowledge of maintenance areas, DWR  
29 environmental staff will evaluate the potential for suitable habitat for special-status species,  
30 sensitive natural communities, and/or cultural resources to occur in the vicinity of the  
31 maintenance footprint. A site visit may be conducted to verify whether sensitive resources  
32 have the potential to be present within the maintenance area. Based on the results of the  
33 desktop review and/or site visit, the following avoidance measures may be required, as  
34 appropriate for the timing, location, and nature of the maintenance activity.
- 35 2. Depending on site-specific conditions and timing, a preconstruction survey may be required  
36 to determine potential presence of suitable habitat for sensitive species prior to the start of  
37 maintenance activities. Surveys will be conducted by a qualified biologist with experience  
38 identifying the resources in question using standard survey protocols and during  
39 appropriate timeframes specific to each sensitive resource.
- 40 3. Appropriate non-disturbance buffers may be applied around sensitive biological resources  
41 and habitat identified during the environmental clearance review or preconstruction  
42 surveys. Non-disturbance buffers will be established by a qualified biologist and will take  
43 into consideration the nature of the maintenance activity, the sensitivity of the species, site-  
44 specific conditions, and applicable state and federal recommendations. Non-disturbance

- 1 buffers may be removed after a qualified biologist determines the sensitive resource is no  
2 longer present or at risk of impacts due to maintenance activities.
- 3 4. When feasible, maintenance activities will avoid impacts on rodent burrows, wetlands, or  
4 other areas that may provide potential habitat to avoid impacts on sensitive biological  
5 resources. Areas to be avoided will be flagged. Debris or cut vegetation may not be left  
6 where it may enter aquatic habitat.
- 7 5. Appropriate work windows and weather restrictions may be applied to avoid impacts on  
8 sensitive biological resources identified during the environmental clearance review or  
9 preconstruction survey.
- 10 6. A Worker Awareness Training may be required if sensitive natural resources are present.  
11 DWR will provide training to maintenance personnel on the importance of protecting  
12 sensitive natural resources (e.g., special-status fish species, wildlife species, plant species,  
13 and designated critical and/or suitable habitats for these species). Preconstruction training  
14 will be conducted so that maintenance personnel are aware of their responsibilities and the  
15 importance of compliance. Construction personnel will be educated on the types of sensitive  
16 resources in the project area and the measures required to avoid and minimize impacts on  
17 these resources. Materials covered in the training program will include environmental rules  
18 and regulations for the specific site requirements for limiting activities to approved work  
19 areas, timing restrictions, and avoidance of sensitive resource areas. A record of personnel  
20 that completed the environmental training will be kept. Operations and maintenance  
21 personnel working in and adjacent to special-status species habitat and natural  
22 communities may also be required to complete the existing DWR environmental trainings at  
23 regular intervals such as the Employee Environmental Responsibility training.
- 24 7. Qualified biologists may be required to monitor maintenance activities in areas identified  
25 during the environmental clearance review and preconstruction surveys as having special-  
26 status fish, wildlife, and plant species and their habitats, designated critical habitat, and  
27 sensitive natural communities.
- 28 8. Any wildlife that is encountered within the maintenance area will be avoided and allowed to  
29 move out of harm's way of its own accord.
- 30 9. Vegetation removal will be kept to the minimum necessary to accomplish maintenance  
31 need.
- 32 10. Spill prevention measures will be implemented to prevent and respond to petroleum  
33 product discharges into wetlands or waters of the United States and State.
- 34 11. Maintenance vehicles will observe a maximum speed limit of 15 miles per hour on un-paved  
35 non-public access roads where it is safe and feasible to do so, and 30 miles per hour on  
36 paved non-public access roads.
- 37 12. All ingress/egress at the project site will be restricted to those routes identified in the  
38 project plans and description. Cross-country access routes will be clearly marked in the field  
39 with appropriate flagging and signs.
- 40 13. All vehicle parking will be restricted to established areas, existing roads, or other suitable  
41 areas.
- 42 14. To prevent harassment, injury, or mortality of sensitive wildlife, no pets will be permitted in  
43 the maintenance area.

- 1 15. Plastic monofilament netting or similar material will not be used for erosion control,  
2 because smaller wildlife may become entangled or trapped in it. Acceptable substitutes  
3 include burlap-wrapped straw wattles, coconut coir matting or tackified hydroseeding  
4 compounds.
- 5 16. Rodenticides and herbicides will be used in accordance with the manufacturer  
6 recommended uses and applications and in such a manner as to prevent primary or  
7 secondary poisoning of special-status fish, wildlife, and plant species and depletion of prey  
8 populations upon which they depend. All uses of such compounds will observe label and  
9 other restrictions mandated by EPA, the California Department of Pesticide Regulation, and  
10 other appropriate state and federal regulations, as well as additional project-related  
11 restrictions imposed by USFWS, NMFS, and/or CDFW. If rodent control must be conducted  
12 in San Joaquin kit fox habitat, zinc phosphide should be used because of its proven lower  
13 risk to kit fox. Use of pesticides may be limited in other resource-specific instances as well.  
14 In addition, the method of rodent control will comply with those discussed in the 4(d) rule  
15 published in the final listing rule for California tiger salamander (*69 Federal Register* [FR]  
16 47211-47248).

#### 17 **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

- 18 1. DWR will contract with electric utilities to provide primary power to designated locations  
19 for project construction and operation. DWR will coordinate with electric utilities to design  
20 and construct power transmission and distribution lines and the locations of necessary  
21 appurtenances such as supports and substations to avoid sensitive terrestrial and aquatic  
22 habitats to the maximum extent feasible and to minimize take and encumbrance of  
23 agricultural lands. In cases where sensitive habitat cannot be feasibly avoided, disturbance  
24 will be minimized to the greatest degree feasible, and disturbed areas will be returned as  
25 near as reasonably and practically feasible to preconstruction conditions by reestablishing  
26 surface conditions through carefully grading, reconstructing features such as irrigation and  
27 drainage facilities, and replanting vegetation and crops and/or compensating farmers for  
28 crops losses. This will be accomplished through an agreement with the utility providers.  
29 Implementation of this measure relies, in part, on coordination and cooperation with all  
30 appropriate utility providers and local agencies to integrate with other construction projects  
31 and minimize disturbances.
- 32 2. DWR will coordinate with electric utilities to design tower and pole placement and location  
33 of substations to avoid existing structures (e.g., agricultural irrigation infrastructure) to the  
34 extent feasible. In cases where existing structures and improvements cannot be feasibly  
35 avoided, DWR will relocate structures and improvements or compensate the owner for the  
36 loss, and will return temporarily disturbed areas to preconstruction conditions. Where poles  
37 or towers are to be constructed in agricultural areas, DWR will require incorporation of the  
38 following BMPs where feasible.
- 39 a. Select means and methods of construction to minimize crop damage.
- 40 b. Use single-pole structures instead of H-frame or other multiple-pole structures to  
41 reduce the potential for interference with farm machinery, reduce land impacts, and  
42 minimize weed encroachment issues.
- 43 c. Locate lines adjacent to roads and existing property lines to reduce property take and  
44 encumbrance.

- 1 d. Use transmission structures with longer spans to clear longer sections of fields or  
2 sensitive areas where feasible. Longer spans may not be feasible in areas where aerial  
3 spraying and seeding is common. In areas where aerial spraying and seeding are  
4 common, install markers on the shield wires above the conductors.
- 5 e. Minimize the use of guy wires, and keep guy wires out of crop and hay lands. Place  
6 highly visible shield guards on guy wires in farm vehicle and equipment traffic areas.
- 7 f. Locate new transmission lines along existing transmission line corridors.
- 8 g. Locate new powerlines on existing poles on same vertical plane as the existing wires.
- 9 3. As part of and prior to approval of construction, DWR will work with electric utilities to  
10 ensure incorporation of bird and raptor-safe design in accordance with the applicable  
11 recommendations presented by the Avian Power Line Interaction Committee (APLIC) in  
12 *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (Avian  
13 Power Line Interaction Committee 2006) and *Reducing Avian Collisions with Power Lines:  
14 State of the Art in 2012* (Avian Power Line Interaction Committee 2012), or with more  
15 current guidance if it becomes available. Applicable APLIC recommendations include, but  
16 are not limited to:
- 17 a. Ensuring sufficient spacing of phase conductors to prevent bird electrocution.
- 18 b. Minimizing the use of guywires. Where the use of guywires is unavoidable, demarcating  
19 guywires using the best available methods to minimize avian collisions (e.g., line  
20 markers).
- 21 c. Reusing or co-locating new transmission facilities and other ancillary facilities with  
22 existing facilities and disturbed areas to minimize habitat impacts and avoid potential  
23 collisions.
- 24 d. Configuring lines to reduce vertical spread of lines and/or decreasing the span length if  
25 such options are feasible.
- 26 e. Marking lines to increase the visibility of lines and reduce the potential for collision.
- 27 4. DWR will work with electric utilities to mark all aboveground project lines and towers  
28 within 3 miles of known greater sandhill crane roost sites with bird flight diverters that are  
29 visible under all conditions (e.g., glow-in-the-dark markers, near-UV line markers). Bird  
30 flight diverters will be installed with the following conditions:
- 31 a. If a new project line will be placed on poles or towers with existing lines that have bird  
32 diverters installed, bird diverters will not be required on the new project lines if the new  
33 project lines can be placed within the same vertical prism as the existing lines.
- 34 b. If a new project line will be placed on poles or towers with existing lines but cannot be  
35 placed within the same vertical prism as the existing lines (e.g., a new project SCADA  
36 line that will be placed on a transmission tower with existing transmission lines), bird  
37 diverters will be required on both the new and existing lines.
- 38 DWR will work with electric utilities to:
- 39 c. Select the most effective and appropriate bird flight diverter for minimizing collisions  
40 based on APLIC recommendations (Avian Power Line Interaction Committee 2006,  
41 2012), or more current guidance if available.

- 1 d. Install bird flight diverters in a configuration, frequency, and spacing consistent with  
2 APLIC recommendations (Avian Power Line Interaction Committee 2006, 2012), or  
3 more current guidance if available.
- 4 e. Periodically inspect and replace bird flight diverters as needed until or unless the  
5 project or existing line is removed.

## 6 **Mitigation Measure CMP: Compensatory Mitigation Plan**

7 Under the CMP (see Impact BIO-1 for a summary discussion of the CMP), tidal freshwater  
8 emergent wetland habitat would be created or acquired and permanently protected to  
9 compensate for project impacts and ensure no significant loss of tidal freshwater emergent  
10 wetland habitat functions and values (Appendix 3F, Section 3F.3.2.5 and Attachment 3F.1, Table  
11 3F.1-2, CMP-2: *Tidal Freshwater Emergent Wetland*).

## 12 ***Mitigation Impacts***

13 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
14 mitigation measure impacts. The analyses below consider the potential impacts associated with  
15 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
16 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
17 *Measures*.

### 18 *Compensatory Mitigation*

19 Implementing the CMP on Bouldin Island and at the I-5 ponds would not result in the permanent  
20 loss of tidal freshwater emergent wetland (Appendix 13C, Table 13C-20). The creation and  
21 enhancement of wetlands and other waters as well as habitat for special-status species under the  
22 project's CMP could result in temporary impacts on tidal freshwater emergent wetland from channel  
23 margin enhancement and tidal restoration.

24 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
25 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would not likely result effects on tidal  
26 freshwater emergent wetland because they would not likely occur within or adjacent to this  
27 community. Site-specific analyses are not provided because locations of potential non-bank sites are  
28 not currently known.

29 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
30 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
31 management of agricultural areas but may also include natural communities in the study area  
32 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
33 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
34 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
35 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These activities would not result in effects on tidal  
36 freshwater emergent wetland relative to baseline conditions because agricultural practices on these  
37 properties would continue as they currently do and the protection of natural communities would  
38 not likely result in any impacts on the tidal freshwater emergent wetland community in the study  
39 area. Site-specific analyses are not provided because locations of potential protection instruments  
40 are not currently known.

1 The CMP and site-specific permitting approvals would ensure that there is no significant loss of  
2 habitat or habitat value by adjusting the overall mitigation commitment (Appendix 3F, Section 3F.1,  
3 Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General Design Guidelines*) and therefore  
4 reduce any habitat losses associated with the CMP to less than significant. The activities to enhance  
5 channel margins would generally include the removal of existing riprap, modification of the existing  
6 channel margin with heavy equipment, and placement of large woody debris on the channel margin.  
7 Tidal restoration activities would include grading, creation of setback levees, planting, and  
8 breaching of existing levees. Implementation of Environmental Commitments EC-3: *Develop and*  
9 *Implement Spill Prevention, Containment, and Countermeasure Plans* and EC-14: *Construction Best*  
10 *Management Practices for Biological Resources* (Appendix 3B) would reduce the potential for  
11 discharge of construction materials into tidal freshwater emergent wetlands. Mitigation Measure  
12 BIO-2a: *Avoid or Minimize Impacts on Special-Status Natural Communities and Special-Status Plants*  
13 would mitigate impacts on tidal freshwater emergent wetlands by identifying locations where  
14 special-status natural communities and special-status plants would be avoided when the CMP is  
15 implemented. Therefore, the impacts on tidal freshwater emergent wetlands from the project  
16 alternatives with the CMP would be less than significant with mitigation.

### 17 Other Mitigation Measures

18 Some mitigation measures would have impacts on tidal freshwater emergent wetlands similar to  
19 those described under Impact BIO-1: *Impacts of the Project on the Tidal Perennial Aquatic Natural*  
20 *Community*. The impacts of habitat loss, ground disturbance, and exposure to hazardous materials  
21 on tidal freshwater emergent wetlands would be reduced through implementation of the CMP,  
22 environmental commitments, and mitigation measures as detailed under Impact BIO-1: *Impacts of*  
23 *the Project on the Tidal Perennial Aquatic Natural Community*. Therefore, impacts on tidal freshwater  
24 emergent wetlands from implementation of other mitigation measures would be reduced to less  
25 than significant.

26 Overall, the impacts on tidal freshwater emergent wetlands from construction of compensatory  
27 mitigation and implementation of other mitigation measures, combined with project alternatives,  
28 would still be less than significant with mitigation.

## 29 **Impact BIO-3: Impacts of the Project on Valley/Foothill Riparian Habitat**

### 30 ***All Project Alternatives***

#### 31 Construction

32 Constructing water conveyance facilities would permanently and temporarily eliminate areas of  
33 valley/foothill riparian habitat. Permanently affected lands would no longer be available as plant  
34 and wildlife habitat. Valley/foothill riparian habitat that would be permanently or temporarily  
35 removed by implementing the project alternatives are summarized in Table 13-9 and shown in  
36 Mapbooks 13-1–13-3. These impacts would occur primarily from constructing access roads, intakes,  
37 levee improvements, power transmission lines, substations, and underground power transmission  
38 lines. The central alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would have a greater overall  
39 effect due to a larger amount of levee improvements. Environmental Commitment EC-14:  
40 *Construction Best Management Practices for Biological Resources* would ensure that temporarily  
41 disturbed areas are restored (Appendix 3B).

1 **Table 13-9. Impacts <sup>a</sup> on the Valley/Foothill Riparian Natural Community by Alternative**

Alternative	Permanent Impacts (acres)	Long-Term Temporary Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
1	51.90	2.61	17.49	72.00
2a	51.18	3.82	20.02	75.02
2b	47.47	1.63	19.05	68.15
2c	48.70	2.90	19.54	71.14
3	13.93	2.79	10.57	27.29
4a	15.60	3.82	11.20	30.62
4b	11.88	1.63	10.25	23.76
4c	13.11	2.90	10.72	26.73
5	15.41	4.05	9.85	29.31

2 <sup>a</sup> See Section 13.3.1.2, *Evaluation of Construction Activities*, for definition of impact types.

3 Field investigations would be conducted prior to and during construction under all project  
4 alternatives to more specifically identify appropriate construction methods and design criteria  
5 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
6 existing utilities, and address the establishment of geological and groundwater monitoring  
7 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
8 would involve a variety of ground-disturbing activities that would vary in duration from several  
9 hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
10 Construction Authority 2022a, 2022b) and could result in impacts on valley/foothill riparian  
11 habitat. Geotechnical investigations associated with tunnels for all alternatives, which include CPTs  
12 and soil borings, would result in temporary impacts on valley/foothill riparian habitat (Appendix  
13 13C). The West Tracy Fault Study and the Bethany Fault Study investigations would not affect  
14 valley/foothill riparian habitat. The following field investigations would be conducted within  
15 proposed surface construction footprints of project facilities (including portions of tunnel  
16 alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, electrical  
17 resistivity tomography (ERT), groundwater testing and monitoring, monument installation, pilot  
18 studies for settlement, agronomic testing, and utility potholing. These temporary impacts are not  
19 characterized as an additional loss of habitat because impacts for these locations have already been  
20 quantified within the construction footprint. Environmental Commitments EC-1: *Conduct Worker  
21 Awareness Training* and EC-14: *Construction Best Management Practices for Biological Resources*  
22 (Appendix 3B) would reduce these potential impacts by training construction staff on the needs of  
23 protecting sensitive biological resources, reporting requirements, and the ramifications for not  
24 following these measures and by having a biological monitor present to ensure that non-disturbance  
25 buffers and associated construction fencing are intact and all other protective measures are being  
26 implemented where applicable.

### 27 Operations

28 As discussed in Chapter 5, *Surface Water*, project operations would not substantially alter river  
29 flows on the Sacramento and San Joaquin Rivers. Therefore, project operations would not  
30 substantially affect valley/foothill riparian habitats.

31 Modeling results from Chapter 5 (Appendix 5A, Section B, Attachment 3, *CalSim 3 Modeling Results*)  
32 for flows upstream of the Delta in the Sacramento, Feather, and American Rivers under all project



1 alternatives show that they are not expected to change substantially beyond the existing variation in  
2 flows. Thus, the project is not anticipated to alter riparian vegetation on these rivers relative to  
3 existing conditions.

4 Though the project would not change operational criteria associated with SWP and CVP north-of-  
5 Delta reservoirs, the operation of the project could indirectly affect how these reservoirs operate  
6 and reservoir levels. Some of these reservoirs may have associated valley/foothill riparian habitat  
7 located along inlet channels. As discussed in Chapter 5, Section 5.3.2.2, *Changes to SWP and CVP*  
8 *Reservoir Storage*, the changes to these reservoir levels are extremely minimal and would thus not  
9 likely significantly affect riparian habitat associated with these reservoirs.

#### 10 Maintenance

11 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
12 in impacts on valley/foothill riparian habitat. Maintenance activities across all facilities that could  
13 affect valley/foothill riparian habitat include repaving of access roads every 15 years and  
14 semiannual general and ground maintenance (e.g., mowing, vegetation trimming, herbicide  
15 application). These activities also create the potential for runoff of paving material or materials from  
16 parked vehicles or staging areas.

#### 17 **CEQA Conclusion—All Project Alternatives**

18 Constructing the project alternatives would cause the removal, conversion, and temporary  
19 disturbance of valley/foothill riparian habitat. Maintenance activities could result in periodic  
20 temporary disturbances to valley/foothill riparian habitat.

21 Temporary disturbances and indirect impacts on valley/foothill riparian habitat would be reduced  
22 by Environmental Commitments EC-1: *Conduct Worker Awareness Training* and EC-14: *Construction*  
23 *Best Management Practices for Biological Resources*. Even with these environmental commitments,  
24 however, the loss of valley/foothill riparian habitat from construction and potential impacts from  
25 maintenance activities would be significant. Mitigation Measure BIO-2a: *Avoid or Minimize Impacts*  
26 *on Special-Status Natural Communities and Special-Status Plants* would reduce impacts on  
27 valley/foothill riparian habitat during project construction. Mitigation Measure BIO-2b: *Avoid and*  
28 *Minimize Impacts on Terrestrial Biological Resources from Maintenance Activities* would reduce  
29 impacts on valley/foothill riparian habitat during project maintenance. Mitigation Measure BIO-2c:  
30 *Electrical Power Line Support Placement* would minimize impacts on valley/foothill riparian habitat  
31 from electric power line installation. Mitigation Measure CMP: *Compensatory Mitigation Plan* would  
32 offset permanent and temporary loss of valley/foothill riparian habitat. Therefore, the impacts on  
33 valley/foothill riparian habitat from the project alternatives would be less than significant with  
34 mitigation.

#### 35 **Mitigation Measure BIO-2a: Avoid or Minimize Impacts on Special-Status Natural** 36 **Communities and Special-Status Plants**

37 See description of Mitigation Measure BIO-2a under Impact BIO-2.

#### 38 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 39 **Resources from Maintenance Activities**

40 See description of Mitigation Measure BIO-2a under Impact BIO-2.

## 1           **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

2           See description of Mitigation Measure BIO-2c under Impact BIO-2.

## 3           **Mitigation Measure CMP: Compensatory Mitigation Plan**

4           Under the CMP (see Impact BIO-1 for a summary discussion of the CMP), DWR would create and  
5           preserve valley/foothill riparian habitat on Bouldin Island and at the I-5 ponds and manage  
6           these areas in perpetuity (Appendix 3F, Section 3F.3.2.3 and Attachment 3F.1, Table 3F.1-2,  
7           CMP-3: *Valley/Foothill Riparian Habitat*).

## 8           ***Mitigation Impacts***

9           As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
10          mitigation measure impacts. The analyses below consider the potential impacts associated with the  
11          CMP and other mitigation measures. Methods for these analyses are presented in Sections 13.3.1.5,  
12          *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation Measures*.

### 13          *Compensatory Mitigation*

14          The creation and enhancement of wetlands and other waters as well as habitat for special-status  
15          species on Bouldin Island and the I-5 ponds under the project's CMP would result in permanent and  
16          temporary losses of valley/foothill riparian habitat from vegetation removal and grading to create  
17          the appropriate topography and soil conditions to establish or restore habitats (Appendix 13C,  
18          Table 13C-20). The CMP could also affect valley/foothill riparian through tidal wetland habitat  
19          restoration and channel margin enhancement because potential areas identified generally support  
20          this community in the study area (Appendix 3F, Section 3F.4.3.4.2, *Site Selection Criteria and Tools*).

21          In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
22          enhancement (Appendix 3F, Section 3F.3.2.4), these activities would not result in effects on  
23          valley/foothill riparian because they would not likely occur within or adjacent to this community.  
24          Site-specific analyses are not provided because locations of potential non-bank sites are not  
25          currently known.

26          Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
27          crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
28          management of agricultural areas but may also include natural communities in the study area  
29          (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
30          *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
31          CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
32          CMP-22b: *Tricolored Blackbird Foraging Habitat*). Except for croplands, some areas could potentially  
33          contain valley/foothill riparian but management activities in these areas would be limited in scope  
34          and would not likely involve physical changes to this community. Site-specific analyses are not  
35          provided because locations of potential protection instruments are not currently known.

36          The CMP and site-specific permitting approvals would ensure that there is no significant loss in  
37          habitat or habitat value by adjusting the overall mitigation commitment (Appendix 3F, Section 3F.1,  
38          Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General Design Guidelines*) and therefore  
39          reduce any habitat losses associated with the CMP to less than significant. Temporary disturbances  
40          and indirect impacts valley/foothill riparian habitat would be reduced by Environmental  
41          Commitment EC-14: *Construction Best Management Practices for Biological Resources* and Mitigation

1 Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status Natural Communities and Special-*  
 2 *Status Plants*. Therefore, the impacts on valley/foothill riparian habitat from the project alternatives  
 3 with the CMP would be less than significant with mitigation.

#### 4 Other Mitigation Measures

5 Some mitigation measures would have impacts on valley/foothill riparian habitat similar to those  
 6 described under Impact BIO-1: *Impacts of the Project on the Tidal Perennial Aquatic Natural*  
 7 *Community*. The impacts of habitat loss, ground disturbance, and exposure to hazardous materials  
 8 on valley/foothill riparian habitat would be reduced through the CMP, environmental commitments,  
 9 and mitigation measures as detailed under Impact BIO-1: *Impacts of the Project on the Tidal*  
 10 *Perennial Aquatic Natural Community*. Therefore, impacts on valley/foothill riparian habitat from  
 11 implementation of other mitigation measures would be reduced to less than significant.

12 Overall, the impacts on valley/foothill riparian habitat from construction of compensatory  
 13 mitigation and implementation of other mitigation measures, combined with project alternatives,  
 14 would still be the less than significant with mitigation.

### 15 **Impact BIO-4: Impacts of the Project on the Nontidal Perennial Aquatic Natural Community**

#### 16 ***All Project Alternatives***

##### 17 Construction

18 Constructing the water conveyance facilities would permanently and temporarily eliminate areas of  
 19 nontidal perennial aquatic habitat. Permanently affected lands would no longer be available as plant  
 20 and wildlife habitat. Impacts would primarily result from constructing the Southern Complex  
 21 (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c), and the Bethany Complex (Alternative 5), from  
 22 constructing shafts and installing power transmission lines (all alternatives), and improving levees  
 23 (all alternatives). Nontidal perennial aquatic habitat that would be permanently or temporarily lost  
 24 by implementation of the project alternatives are summarized in Table 13-10 and shown in  
 25 Mapbooks 13-1–13-3. Environmental Commitments EC-1: *Conduct Worker Awareness Training*, EC-  
 26 *2: Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement*  
 27 *Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
 28 *Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by training  
 29 construction staff on the needs of protecting sensitive biological resources, reporting requirements,  
 30 and the ramifications for not following these measures; by implementing spill prevention and  
 31 containment plans that would avoid material spills that could affect aquatic habitat; and by having a  
 32 biological monitor present to ensure that non-disturbance buffers and associated construction  
 33 fencing are intact and all other protective measures are being implemented where applicable.

34 **Table 13-10. Impacts <sup>a</sup> on the Nontidal Perennial Aquatic Natural Community by Alternative**

Alternative	Permanent Impacts (acres)	Long-Term Temporary Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
1	0.26	0.29	0.51	1.06
2a	0.39	0.29	0.76	1.44
2b	0.22	0.10	0.46	0.78
2c	0.22	0.19	0.55	0.96

Alternative	Permanent Impacts (acres)	Long-Term Temporary Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
3	0.21	0.29	0.38	0.88
4a	0.38	0.29	0.59	1.26
4b	0.21	0.10	0.29	0.60
4c	0.21	0.19	0.38	0.78
5	0.53	0.83	0.32	1.68

<sup>a</sup> See Section 13.3.1.2, *Evaluation of Construction Activities*, for definition of impact types.

Field investigations would be conducted prior to and during construction under all project alternatives to more specifically identify appropriate construction methods and design criteria addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities, and address the establishment of geological and groundwater monitoring programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a variety of ground-disturbing activities that would vary in duration from several hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and Construction Authority 2022a, 2022b) and could result in impacts on nontidal perennial aquatic habitat. Geotechnical investigations associated with tunnels for all alternatives, which include CPTs and soil borings, would result in temporary impacts on nontidal perennial aquatic habitat (Appendix 13C). The West Tracy Fault Study and the Bethany Fault Study investigations, pilot studies for settlement, agronomic testing, and utility potholing would not occur in nontidal perennial aquatic habitat. The following field investigations would be conducted within proposed surface construction footprints of project facilities (including portions of tunnel alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT, groundwater testing and monitoring, and monument installation. These temporary impacts are not characterized as an additional loss of habitat because impacts for these locations have already been quantified within the construction footprint. Environmental Commitments EC-1: *Conduct Worker Awareness Training* and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) minimizing locating test trenches, CPTs, and borings in aquatic features, to the extent possible, in areas where there would be no additional surface disturbance during construction; (2) training construction staff on protecting sensitive biological resources, reporting requirements, and the ramifications for not following these measures; and (3) having a biological monitor present to ensure that non-disturbance buffers and associated construction fencing are intact and all other protective measures are being implemented where applicable.

### Operations

The project would not operate in nontidal perennial aquatic natural communities and would have no operational effects on this habitat within the study area.

Though the project would not change operational criteria associated with SWP and CVP north-of-Delta reservoirs, which would be considered a nontidal perennial aquatic community, the operation of the project could indirectly affect how these reservoirs operate and reservoir levels. As discussed in Chapter 5, Section 5.3.2.2, *Changes to SWP and CVP Reservoir Storage*, the changes to these reservoirs are extremely minimal and would thus not significantly change the extent of nontidal perennial aquatic habitat.

## 1 Maintenance

2 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
3 in impacts on nontidal perennial aquatic habitat. Maintenance activities across all facilities that  
4 could affect nontidal perennial aquatic habitat include repaving of access roads every 15 years and  
5 semiannual general and ground maintenance, which could result in advertent discharge of fill  
6 material. These activities also create the potential for runoff of paving material or materials from  
7 parked vehicles or staging areas.

## 8 **CEQA Conclusion—All Project Alternatives**

9 Constructing the project alternatives would cause the removal, conversion, and temporary  
10 disturbance of nontidal aquatic perennial habitat. Maintenance activities could result in periodic  
11 temporary disturbances to nontidal perennial aquatic habitat.

12 Temporary disturbances and indirect impacts on nontidal perennial aquatic habitat would be  
13 reduced by Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop*  
14 *and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
15 *Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
16 *Practices for Biological Resources*. Even with these environmental commitments, however, the loss of  
17 nontidal perennial aquatic habitat from construction and potential impacts from maintenance  
18 activities would be significant. Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-*  
19 *Status Natural Communities and Special-Status Plants* would mitigate impacts on nontidal perennial  
20 aquatic habitat by identifying locations where special-status natural communities and special-status  
21 plants would be avoided. Under Mitigation Measure CMP: *Compensatory Mitigation Plan*, nontidal  
22 perennial aquatic habitat would be created or acquired and permanently protected to compensate  
23 for project impacts from project construction to ensure no significant loss of nontidal perennial  
24 aquatic habitat functions and values. Therefore, the impacts on nontidal perennial aquatic habitat  
25 from the project alternatives would be less than significant with mitigation.

## 26 **Mitigation Measure BIO-2a: Avoid or Minimize Impacts on Special-Status Natural** 27 **Communities and Special-Status Plants**

28 See description of Mitigation Measure BIO-2a under Impact BIO-2.

## 29 **Mitigation Measure CMP: Compensatory Mitigation Plan**

30 Under the CMP (see Impact BIO-1 for a summary discussion of the CMP), DWR would create and  
31 preserve nontidal perennial aquatic habitat on Bouldin Island and at the I-5 ponds and manage  
32 these areas in perpetuity (Appendix 3F, Section 3F.3.2.3 and Attachment 3F.1, Table 3F.1-2,  
33 CMP-4: *Nontidal Perennial Aquatic Habitat*).

## 34 **Mitigation Impacts**

35 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
36 mitigation measure impacts. The analyses below consider the potential impacts associated with  
37 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
38 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
39 *Measures*.

### 1 Compensatory Mitigation

2 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
3 species on Bouldin Island and the I-5 ponds under the project's CMP would result in the conversion  
4 of nontidal perennial aquatic communities (Appendix 13C, Table 3C-20) from grading to create the  
5 appropriate topography and soil conditions to establish or restore habitats. The CMP could also  
6 impact nontidal perennial aquatic habitat through tidal wetland habitat restoration and channel  
7 margin enhancement because potential areas identified generally support this community in the  
8 study area (Appendix 3F, Section 3F.4.3.4.2 *Site Selection Criteria and Tools*).

9 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
10 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would not result in effects on the  
11 nontidal perennial aquatic plants because they would not likely occur within or adjacent to habitat  
12 for these species. Site-specific analyses are not provided because locations of potential non-bank  
13 sites are not currently known.

14 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
15 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
16 management of agricultural areas but may also include natural communities in the study area  
17 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
18 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
19 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
20 CMP-22b: *Tricolored Blackbird Foraging Habitat*). Except for croplands, some areas could potentially  
21 contain the nontidal perennial aquatic plant habitat or occurrences but management activities in  
22 these areas would be limited in scope and would not likely involve physical changes to this  
23 community. Site-specific analyses are not provided because locations of potential protection  
24 instruments are not currently known.

25 The CMP and site-specific permitting approvals would ensure that there is no significant loss in  
26 habitat or habitat value by adjusting the overall mitigation commitment (Appendix 3F, Section 3F.1,  
27 Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General Design Guidelines*) and therefore  
28 would reduce any habitat losses associated with the CMP to less than significant. Environmental  
29 Commitments EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure*  
30 *Plans*; EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B); and  
31 Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status Natural Communities and*  
32 *Special-Status Plants* would reduce the impacts on nontidal perennial aquatic habitat from the  
33 project alternatives with the CMP to less than significant with mitigation.

### 34 Other Mitigation Measures

35 Some mitigation measures would have impacts on the nontidal perennial aquatic natural community  
36 similar to those described under Impact BIO-1: *Impacts of the Project on the Tidal Perennial Aquatic*  
37 *Natural Community*. The impacts of habitat loss, ground disturbance, and exposure to hazardous  
38 materials on the nontidal perennial aquatic natural community would be reduced through the CMP,  
39 environmental commitments, and mitigation measures as detailed under Impact BIO-1: *Impacts of*  
40 *the Project on the Tidal Perennial Aquatic Natural Community*. Therefore, impacts on the nontidal  
41 perennial aquatic natural community from implementation of other mitigation measures would be  
42 reduced to less than significant.

1 Overall, the impacts on the nontidal perennial aquatic natural community from construction of  
 2 compensatory mitigation and implementation of other mitigation measures, combined with project  
 3 alternatives, would still be less than significant with mitigation.

#### 4 **Impact BIO-5: Impacts of the Project on Nontidal Freshwater Perennial Emergent Wetland**

##### 5 ***All Project Alternatives***

##### 6 *Construction*

7 Constructing the water conveyance facilities would permanently and temporarily eliminate areas of  
 8 nontidal freshwater perennial emergent wetlands. Permanently affected lands would no longer be  
 9 available as plant and wildlife habitat. The impacts would result primarily from improving levees  
 10 (Alternatives 1, 2a, 2b, and 2c) and access roads (all alternatives). Nontidal freshwater perennial  
 11 emergent wetlands that would be permanently or temporarily lost by implementing the project  
 12 alternatives are summarized in Table 13-11 and are shown in Mapbooks 13-1–13-3. The central  
 13 alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would have a larger effect on nontidal  
 14 freshwater wetlands than the eastern and Bethany Reservoir alignment alternatives (Alternatives 3,  
 15 4a, 4b, 4c, and 5) due to greater impacts from improving levees and access roads and constructing  
 16 other roads. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop*  
 17 *and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
 18 *Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
 19 *Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by training  
 20 construction staff on protecting sensitive biological resources, reporting requirements, and the  
 21 ramifications for not following these measures; by implementing spill prevention and containment  
 22 plans that would avoid material spills that could affect wetland habitat; and by having a biological  
 23 monitor present to ensure that non-disturbance buffers and associated construction fencing are  
 24 intact and all other protective measures are being implemented where applicable.

25 **Table 13-11. Impacts <sup>a</sup> on Nontidal Freshwater Perennial Emergent Wetland by Alternative**

Alternative	Permanent Impacts (acres)	Long-Term Temporary Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
1,	5.07	0.00	4.55	9.62
2a, 2c	3.63	0.00	5.94	9.57
2b	3.41	0.00	5.64	9.05
3, 4a, 4c	0.24	0.00	0.61	0.85
4b	0.02	0.00	0.31	0.33
5	0.30	0.00	0.45	0.75

26 <sup>a</sup> See Section 13.3.1.2, *Evaluation of Construction Activities*, for definition of impact types.

27 Field investigations would be conducted prior to and during construction under all project  
 28 alternatives to more specifically identify appropriate construction methods and design criteria  
 29 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
 30 existing utilities, and address the establishment of geological and groundwater monitoring  
 31 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
 32 would involve a variety of ground-disturbing activities that would vary in duration from several  
 33 hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
 34 Construction Authority 2022a, 2022b) and could result in impacts on nontidal freshwater perennial

1 emergent wetlands. Geotechnical investigations associated with tunnels for all alternatives, which  
2 include CPTs and soil borings, would result in temporary impacts on nontidal freshwater perennial  
3 emergent wetlands (Appendix 13C). The West Tracy Fault Study and the Bethany Fault Study  
4 investigations, pilot studies for settlement, agronomic testing, and utility potholing would not occur  
5 in nontidal freshwater perennial emergent wetlands. The following field investigations would be  
6 conducted within proposed surface construction footprints of project facilities (including portions of  
7 tunnel alignments), and would temporarily affect tidal emergent wetlands: test trenches, CPTs, soil  
8 borings, ERT, groundwater testing and monitoring, monument installation. These temporary  
9 impacts are not characterized as an additional loss of habitat because impacts for these locations  
10 have already been quantified within the construction footprint. Environmental Commitments EC-1:  
11 *Conduct Worker Awareness Training* and EC-14: *Construction Best Management Practices for*  
12 *Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) minimizing locating  
13 test trenches, CPTs, and borings in aquatic features, to the extent possible, in areas where there  
14 would be no additional surface disturbance during construction; (2) training construction staff on  
15 protecting sensitive biological resources, reporting requirements, and the ramifications for not  
16 following these measures; and (3) having a biological monitor present to ensure that non-  
17 disturbance buffers and associated construction fencing are intact and all other protective measures  
18 are being implemented where applicable.

### 19 Operations

20 The project would not operate in nontidal freshwater perennial emergent wetlands and would have  
21 no operational effects on this habitat in the study area.

22 Though the project would not change operational criteria associated with SWP and CVP north-of-  
23 Delta reservoirs, the operation of the project could indirectly affect how these reservoirs operate  
24 and reservoir levels. Some of these reservoirs may have associated nontidal freshwater perennial  
25 emergent wetland habitat located on the margins of the reservoir or along inlet channels. As  
26 discussed in Chapter 5, Section 5.3.2.2, *Changes to SWP and CVP Reservoir Storage*, the changes to  
27 these reservoir levels are extremely minimal and would thus not likely significantly affect wetlands  
28 associated with these reservoirs.

### 29 Maintenance

30 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
31 in impacts on nontidal freshwater perennial emergent wetlands. Maintenance activities across all  
32 facilities that could affect nontidal freshwater perennial emergent wetlands include repaving of  
33 access roads every 15 years and semiannual general and ground maintenance (e.g., mowing,  
34 vegetation trimming, herbicide application). These activities also create the potential for runoff of  
35 paving material or materials from parked vehicles or staging areas.

### 36 **CEQA Conclusion—All Project Alternatives**

37 Constructing the project alternatives would cause the removal, conversion, and temporary  
38 disturbance of nontidal freshwater perennial emergent wetlands. Maintenance activities could  
39 result in periodic temporary disturbances to this community.

40 Temporary disturbances and indirect impacts on nontidal freshwater perennial emergent wetland  
41 would be reduced by Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2:  
42 *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*



1 *Prevention, Containment, and Countermeasure Plans*; and Environmental Commitment EC-14:  
2 *Construction Best Management Practices for Biological Resources*. Even with these environmental  
3 commitments, however, the loss of nontidal freshwater perennial emergent wetland from  
4 construction and potential impacts from maintenance activities would be significant. Mitigation  
5 Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status Natural Communities and Special-*  
6 *Status Plants* would mitigate impacts on nontidal freshwater emergent wetlands by identifying  
7 locations where special-status natural communities and special-status plants would be avoided or  
8 where measures to minimize impact would be implemented. Under Mitigation Measure CMP:  
9 *Compensatory Mitigation Plan*, nontidal perennial emergent wetlands would be created or acquired  
10 and permanently protected to compensate for project impacts from project construction and ensure  
11 no significant loss of nontidal perennial aquatic habitat functions and values. Therefore, the impacts  
12 on nontidal freshwater perennial emergent wetland from the project alternatives would be less than  
13 significant with mitigation.

#### 14 **Mitigation Measure BIO-2a: Avoid or Minimize Impacts on Special-Status Natural** 15 **Communities and Special-Status Plants**

16 See description of Mitigation Measure BIO-2a under Impact BIO-2.

#### 17 **Mitigation Measure CMP: Compensatory Mitigation Plan**

18 Under the CMP (see Impact BIO-1 for a summary discussion of the CMP), DWR would create and  
19 preserve nontidal freshwater perennial emergent wetland habitat and manage these areas in  
20 perpetuity (Appendix 3F, Section 3F.3.2.3 and Attachment 3F.1, Table 3F.1-2, CMP-5: *Nontidal*  
21 *Freshwater Perennial Emergent Wetland*).

#### 22 ***Mitigation Impacts***

23 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
24 mitigation measure impacts. The analyses below consider the potential impacts associated with  
25 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
26 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
27 *Measures*.

#### 28 **Compensatory Mitigation**

29 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
30 species on Bouldin Island and the I-5 ponds under the project's CMP would result in the conversion  
31 of nontidal freshwater perennial emergent wetlands to other natural communities (Appendix 13C,  
32 Table 13C-20) from grading to create the appropriate topography and soil conditions to establish or  
33 restore habitats. The CMP could also affect this community through tidal wetland habitat restoration  
34 and channel margin enhancement because potential areas identified generally support this  
35 community in the study area (Appendix 3F, Section 3F.4.3.4.2, *Site Selection Criteria and Tools*).

36 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
37 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would not result in effects on nontidal  
38 freshwater emergent wetland because they would not likely occur within or adjacent to this  
39 community. Site-specific analyses are not provided because locations of potential non-bank sites are  
40 not currently known.

1 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
2 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
3 management of agricultural areas but may also include natural communities in the study area  
4 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
5 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
6 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
7 CMP-22b: *Tricolored Blackbird Foraging Habitat*). Except for croplands, some areas could potentially  
8 contain nontidal freshwater emergent wetland but management activities in these areas would be  
9 limited in scope and would not likely involve physical changes to this community. Site-specific  
10 analyses are not provided because locations of potential protection instruments are not currently  
11 known.

12 The CMP and site-specific permitting approvals would ensure that there is no significant loss in  
13 habitat or habitat value by adjusting the overall mitigation commitment (Appendix 3F, Section 3F.1,  
14 Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General Design Guidelines*) and therefore  
15 reduce any habitat losses associated with the CMP to less than significant. Environmental  
16 Commitments EC-3: *Develop and Implement Spill Prevention, Containment and Countermeasure Plans*  
17 and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would  
18 reduce the potential for discharge of construction materials into aquatic resources. Mitigation  
19 Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status Natural Communities and Special-*  
20 *Status Plants* would mitigate impacts on nontidal freshwater perennial emergent wetlands.  
21 Therefore, the impacts on nontidal freshwater perennial emergent wetlands from the project  
22 alternatives with the CMP would be less than significant with mitigation.

### 23 Other Mitigation Measures

24 Some mitigation measures would have impacts on nontidal freshwater perennial emergent wetland  
25 similar to those described under Impact BIO-1: *Impacts of the Project on the Tidal Perennial Aquatic*  
26 *Natural Community*. The impacts of habitat loss, ground disturbance, and exposure to hazardous  
27 materials on nontidal freshwater perennial emergent wetland would be reduced through the CMP,  
28 environmental commitments, and mitigation measures as detailed under Impact BIO-1: *Impacts of*  
29 *the Project on the Tidal Perennial Aquatic Natural Community*. Therefore, impacts on nontidal  
30 freshwater perennial emergent wetland from implementation of other mitigation measures would  
31 be reduced to less than significant.

32 Overall, the impacts on nontidal freshwater perennial emergent wetland from construction of  
33 compensatory mitigation and implementation of other mitigation measures, combined with project  
34 alternatives, would still be less than significant with mitigation.

## 35 **Impact BIO-6: Impacts of the Project on Nontidal Brackish Emergent Wetland**

### 36 ***All Project Alternatives***

#### 37 Construction

38 Construction of the alternatives would not result in impacts on nontidal brackish emergent wetland  
39 (Table 13-12).

1 **Table 13-12. Impacts<sup>a</sup> on Nontidal Brackish Emergent Wetland by Alternative**

Alternative	Permanent Impacts (acres)	Log-Term Temporary Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
All	0.00	0.00	0.00	0.00

2 <sup>a</sup> See Section 13.3.1.2, *Evaluation of Construction Activities*, for definition of impact types.3 ***Operations***4 The project would not operate in nontidal brackish emergent wetlands and would have no  
5 operational effects on this habitat.6 ***Maintenance***7 No nontidal brackish emergent wetlands were mapped within or adjacent to project facilities and  
8 thus there would not likely be any maintenance-related effects on this community.9 ***CEQA Conclusion—All Alternatives***10 All project alternatives would result in no impact on nontidal brackish emergent wetland because  
11 this community does not occur in the vicinity of project construction, operations, or maintenance  
12 areas, or compensatory mitigation areas.13 ***Mitigation Impacts***14 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
15 mitigation measure impacts. The analyses below consider the potential impacts associated with the  
16 CMP and other mitigation measures. Methods for these analyses are presented in Sections 13.3.1.5,  
17 *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation Measures*.18 ***Compensatory Mitigation***19 Implementation of the CMP on Bouldin Island and the I-5 ponds would not result in impacts on  
20 nontidal brackish emergent wetland (Appendix 13C, Table 13C-20). However, implementation of the  
21 CMP could result in impacts on nontidal brackish emergent wetland through tidal wetland habitat  
22 restoration and channel margin enhancement because potential areas identified for restoration  
23 include the Cache Slough Complex and lower Yolo Bypass (Appendix 3F, Section 3F.4.3.4.2, *Site*  
24 *Selection Criteria and Tools*), which occur adjacent to nontidal brackish emergent wetland. Grading  
25 and fill to support these activities could directly affect habitat or result in changes to topography and  
26 soils such that the hydrology of nontidal brackish emergent wetland could be adversely affected.27 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
28 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would not result in effects on nontidal  
29 brackish emergent wetland because they would not likely occur within or adjacent to this  
30 community. Site-specific analyses are not provided because locations of potential non-bank sites are  
31 not currently known.32 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
33 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
34 management of agricultural areas but may also include natural communities in the study area  
35 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*

1 *Habitat, CMP-18b: Sandhill Crane Foraging Habitat, CMP-19a: Swainson's Hawk Nesting Habitat,*  
 2 *CMP-19b: Swainson's Hawk Foraging Habitat, CMP-22a: Tricolored Blackbird Nesting Habitat, and*  
 3 *CMP-22b: Tricolored Blackbird Foraging Habitat).* Except for croplands, some areas could potentially  
 4 contain nontidal brackish emergent wetland but management activities in these areas would be  
 5 limited in scope and would not likely involve physical changes to this community. Site-specific  
 6 analyses are not provided because locations of potential protection instruments are not currently  
 7 known.

8 Temporary disturbances and indirect impacts on nontidal brackish emergent wetland would be  
 9 reduced by Environmental Commitment EC-14: *Construction Best Management Practices for*  
 10 *Biological Resources.* Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status*  
 11 *Natural Communities and Special-Status Plants,* Mitigation Measure BIO-2b: *Avoid and Minimize*  
 12 *Impacts on Terrestrial Biological Resources from Maintenance Activities,* and Mitigation Measure  
 13 *CMP: Compensatory Mitigation Plan (Attachment 3F.1)* would reduce this impact to a less-than-  
 14 significant level with mitigation.

15 Therefore, the impacts on nontidal brackish emergent wetland from the project alternatives with  
 16 the CMP would be less than significant with mitigation.

#### 17 Other Mitigation Measures

18 Other mitigation measures proposed would not have impacts on nontidal brackish emergent  
 19 wetland because this community does not occur in the vicinity of project construction areas.

### 20 **Impact BIO-7: Impacts of the Project on Alkaline Seasonal Wetland Complex**

#### 21 ***All Project Alternatives***

##### 22 Construction

23 Constructing the water conveyance facilities would permanently and temporarily eliminate areas of  
 24 alkaline seasonal wetland complex. Permanently affected lands would no longer be available as  
 25 plant and wildlife habitat. Alkaline seasonal wetland complex that would be permanently or  
 26 temporarily removed by implementing the project alternatives is summarized in Table 13-13 and  
 27 shown in Mapbooks 13-1–13-3. Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c would have greater  
 28 impacts than Alternative 5. Under Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c, impacts would be  
 29 associated with the Southern Complex facilities and geotechnical investigations. Under Alternative 5,  
 30 impacts would be associated primarily with geotechnical investigations. Environmental  
 31 Commitment EC-14: *Construction Best Management Practices for Biological Resources* would ensure  
 32 that temporarily disturbed areas are restored (Appendix 3B).

33 **Table 13-13. Impacts <sup>a</sup> on Alkaline Seasonal Wetland Complex by Alternative**

Alternative	Permanent Impacts (acres)	Long-Term Temporary Impacts (acres)	Temporary Impacts (acres)	Total Impacts (acres)
1, 2a, 2b, 2c, 3, 4a, 4b, 4c	1.86	0.40	2.50	4.76
5	0.22	0.00	0.54	0.76

34 <sup>a</sup> See Section 13.3.1.2, *Evaluation of Construction Activities*, for definition of impact types.

1 Field investigations would be conducted prior to and during construction under all project  
2 alternatives to more specifically identify appropriate construction methods and design criteria  
3 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
4 existing utilities, and address the establishment of geological and groundwater monitoring  
5 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
6 would involve a variety of ground-disturbing activities that would vary in duration from several  
7 hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
8 Construction Authority 2022a, 2022b) and could result in impacts on alkaline seasonal wetland  
9 complex. Geotechnical investigations associated with tunnels for all alternatives, which include CPTs  
10 and soil borings, would result in temporary impacts on alkaline seasonal wetland complex  
11 (Appendix 13C). The West Tracy Fault Study and the Bethany Fault Study investigations would not  
12 affect alkaline seasonal wetland complex. The following field investigations would be conducted  
13 within proposed surface construction footprints of project facilities (including portions of tunnel  
14 alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, electrical  
15 resistivity tomography, groundwater testing and monitoring, monument installation, pilot studies  
16 for settlement, agronomic testing, and utility potholing. These temporary impacts are not  
17 characterized as an additional loss of habitat because impacts for these locations have already been  
18 quantified within the construction footprint. Environmental Commitments EC-1: *Conduct Worker*  
19 *Awareness Training* and EC-14: *Construction Best Management Practices for Biological Resources*  
20 (Appendix 3B) would reduce these potential impacts by (1) minimizing locating test trenches, CPTs,  
21 and borings in aquatic features, to the extent possible, in areas where there would be no additional  
22 surface disturbance during construction; (2) training construction staff on protecting sensitive  
23 biological resources, reporting requirements, and the ramifications for not following these  
24 measures; and (3) having a biological monitor present to ensure that non-disturbance buffers and  
25 associated construction fencing are intact and all other protective measures are being implemented  
26 where applicable.

### 27 Operations

28 Project operations would not take place in alkaline seasonal wetlands and would not affect this  
29 habitat.

### 30 Maintenance

31 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
32 in impacts on alkaline seasonal wetland complex, when they occur adjacent to facilities. Maintenance  
33 activities across all facilities that could affect this community include repaving of access roads every  
34 15 years and semiannual general and ground maintenance (e.g., mowing, vegetation trimming,  
35 herbicide application). These activities also create the potential for runoff of paving material or  
36 materials from parked vehicles or staging areas.

### 37 **CEQA Conclusion—All Project Alternatives**

38 Under all project alternatives, project construction and maintenance would remove, convert, or  
39 temporarily disturb alkaline seasonal wetland complex.

40 Temporary disturbances and indirect impacts on alkaline seasonal wetland complex would be  
41 reduced by Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop*  
42 *and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*

1 *Prevention, Containment, and Countermeasure Plans; and EC-14: Construction Best Management*  
2 *Practices for Biological Resources.* Even with these environmental commitments, however, the loss of  
3 alkaline seasonal wetland complex from construction and potential impacts from maintenance  
4 activities would be significant. Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-*  
5 *Status Natural Communities and Special-Status Plants* would reduce impacts on alkaline seasonal  
6 wetlands during project construction. Mitigation Measure BIO-2b: *Avoid and Minimize Impacts on*  
7 *Terrestrial Biological Resources from Maintenance Activities* would reduce impacts on alkaline  
8 seasonal wetlands during project maintenance. Mitigation Measure BIO-2c: *Electrical Power Line*  
9 *Support Placement* would minimize impacts on alkaline seasonal wetland from electric power line  
10 installation. Under Mitigation Measure CMP: *Compensatory Mitigation Plan* alkaline seasonal  
11 wetland complex would be created or acquired and permanently protected to compensate for  
12 project impacts from project construction and ensure no significant loss of nontidal perennial  
13 aquatic habitat functions and values. The total acreage to be conserved would be based on the  
14 criteria presented in the CMP. Therefore, the impacts on alkaline seasonal wetland complex from the  
15 project alternatives would be less than significant with mitigation.

16 **Mitigation Measure BIO-2a: Avoid or Minimize Impacts on Special-Status Natural**  
17 **Communities and Special-Status Plants**

18 See description of Mitigation Measure BIO-2a under Impact BIO-2.

19 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
20 **Resources from Maintenance Activities**

21 See description of Mitigation Measure BIO-2a under Impact BIO-2.

22 **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

23 See description of Mitigation Measure BIO-2c under Impact BIO-2.

24 **Mitigation Measure CMP: Compensatory Mitigation Plan**

25 DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to  
26 offset the loss of alkaline seasonal wetland complex by purchasing credits at an agency-  
27 approved mitigation bank or at a non-bank site approved by the agencies supporting and  
28 implementing the design commitments and guidelines for special-status plants (Appendix 3F,  
29 Section 3F.3.2.4 and Attachment 3F.1, Table 3F.1-2, CMP-7: *Alkaline Seasonal Wetland Complex*).

30 ***Mitigation Impacts***

31 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
32 mitigation measure impacts. The analyses below consider the potential impacts associated with  
33 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
34 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
35 *Measures*.

36 **Compensatory Mitigation**

37 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
38 species under the project's CMP would not affect alkaline seasonal wetland complex because this

1 natural community does not occur at the I-5 ponds nor on Bouldin Island, and is not located within  
2 the areas where tidal restoration and channel margin enhancement could occur.

3 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
4 enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in the temporary  
5 disturbance of existing alkaline seasonal wetlands but would ultimately in a benefit to the  
6 community. Site-specific analyses are not provided because locations of potential non-bank sites are  
7 not currently known.

8 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
9 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
10 management of agricultural areas but may also include natural communities in the study area  
11 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting  
12 Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
13 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
14 CMP-22b: *Tricolored Blackbird Foraging Habitat*). Alkaline seasonal wetlands would not be targeted  
15 for these specific site protection instruments so there would not likely be any effects on this  
16 community. Site-specific analyses are not provided because locations of potential protection  
17 instruments are not currently known.

18 The impacts on alkaline seasonal wetland complex from the project alternatives with the CMP would  
19 be less than significant with mitigation.

#### 20 Other Mitigation Measures

21 Some mitigation measures would involve ground disturbance and the use of heavy equipment that  
22 would have the potential to result in loss of areas of alkaline seasonal wetland complex from ground  
23 disturbance, movement of construction vehicles, or inadvertent discharge of construction-related  
24 fluids such as fuels, oils, and cement. Impacts on alkaline seasonal wetland complex resulting from  
25 mitigation measures would be similar to construction effects of the project alternatives in certain  
26 construction areas and would contribute to alkaline seasonal wetland complex impacts of the  
27 project alternatives.

28 The impacts of habitat loss, ground disturbance, and exposure to hazardous materials on alkaline  
29 seasonal wetland complex would be reduced through the CMP and Environmental Commitments EC-  
30 1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials  
31 Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure  
32 Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*. Additionally,  
33 Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status Natural Communities and  
34 Special-Status Plants* would reduce impacts on alkaline seasonal wetland complex. Therefore,  
35 impacts on alkaline seasonal wetland complex from implementation of other mitigation measures  
36 would be reduced to less than significant.

37 Overall, the impacts on alkaline seasonal wetland complex from construction of compensatory  
38 mitigation and implementation of other mitigation measures, combined with project alternatives,  
39 would still be less than significant with mitigation.

## 1 **Impact BIO-8: Impacts of the Project on Vernal Pool Complex**

### 2 ***All Project Alternatives***

#### 3 *Construction*

4 Under all project alternatives, constructing the water conveyance facilities would permanently and  
 5 temporarily eliminate areas of vernal pool complex. Permanently affected lands would no longer be  
 6 available as plant and wildlife habitat. The Bethany Reservoir alternative (Alternative 5) would have  
 7 a larger impact on vernal pool complex than the central alignment alternatives (Alternatives 1, 2a,  
 8 2b, and 2c) and the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c) from the  
 9 construction of the Bethany Reservoir Aqueduct. Under Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c,  
 10 impacts would be associated with the Southern Complex facilities. Alternatives 2b and 4b would  
 11 have slightly smaller impacts than Alternatives 1, 2a, 2c, 3, 4a, and 4c because fewer roads would be  
 12 constructed. Vernal pool complex that would be permanently or temporarily removed by  
 13 implementing the project alternatives is summarized in Table 13-14 and shown in Mapbooks 13-1-  
 14 13-3. Environmental Commitment EC-14: *Construction Best Management Practices for Biological*  
 15 *Resources* would ensure that temporarily disturbed areas are restored (Appendix 3B).

16 **Table 13-14. Impacts <sup>a</sup> on the Vernal Pool Complex by Alternative**

Alternative	Permanent Impacts (acres)	Long-Term Temporary Impacts (acres)	Temporary Impacts (acres)	Total (acres)
1, 2a, 2c, 3, 4a, 4c	9.02	0.00	10.15	19.17
2b, 4b	8.95	0.00	9.90	18.85
5	11.91	11.61	2.56	26.08

17 <sup>a</sup> See Section 13.3.1.2, *Evaluation of Construction Activities*, for definition of impact types.

18 Field investigations would be conducted prior to and during construction under all project  
 19 alternatives to more specifically identify appropriate construction methods and design criteria  
 20 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
 21 existing utilities, and address the establishment of geological and groundwater monitoring  
 22 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
 23 would involve a variety of ground-disturbing activities that would vary in duration from several  
 24 hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
 25 Construction Authority 2022a, 2022b) and could result in impacts on vernal pool  
 26 complex. Geotechnical investigations that would occur in the West Tracy Fault Study area and over  
 27 the tunnel alignment footprints which include test trenches, CPTs, soil borings, and geophysical  
 28 arrays, would result in temporary impacts on vernal pool complex. The Bethany Fault Study  
 29 investigations would not affect modeled vernal pool complex. The following field investigations  
 30 would be conducted within proposed surface construction footprints of project facilities (including  
 31 portions of tunnel alignments) and would temporarily affect habitat: test trenches, CPTs, soil  
 32 borings, ERT, groundwater testing and monitoring, monument installation, pilot studies for  
 33 settlement, agronomic testing, and utility potholing. These temporary impacts are not characterized  
 34 as an additional loss of habitat because impacts for these locations have already been quantified  
 35 within the construction footprint. Environmental Commitments EC-1: *Conduct Worker Awareness*  
 36 *Training* and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B)  
 37 would reduce these potential impacts by (1) minimizing locating test trenches, CPTs, and borings in  
 38 aquatic features, to the extent possible, in areas where there would be no additional surface



1 disturbance during construction; (2) training construction staff on protecting sensitive biological  
2 resources, reporting requirements, and the ramifications for not following these measures; and (3)  
3 having a biological monitor present to ensure that non-disturbance buffers and associated  
4 construction fencing are intact and all other protective measures are being implemented where  
5 applicable.

#### 6 Operations

7 Project operations would not take place in vernal pools and would not affect vernal pool habitat.

#### 8 Maintenance

9 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
10 in impacts on vernal pool complex, when they occur adjacent to facilities. Maintenance activities  
11 across all facilities that could affect this community include repaving of access roads every 15 years  
12 and semiannual general and ground maintenance (e.g., mowing, vegetation trimming, herbicide  
13 application). These activities also create the potential for runoff of paving material or materials from  
14 parked vehicles or staging areas.

#### 15 **CEQA Conclusion—All Project Alternatives**

16 Constructing the project alternatives would cause the removal, conversion, and temporary  
17 disturbance of vernal pool complex. Maintenance activities could result in periodic temporary  
18 disturbances to this community.

19 Temporary disturbances and indirect impacts on vernal pool complex would be reduced by  
20 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
21 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
22 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
23 *Biological Resources*. Even with these environmental commitments, however, the loss of vernal pool  
24 complex from construction and potential impacts from maintenance activities would be significant.  
25 Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status Natural Communities and*  
26 *Special-Status Plants* would reduce impacts on vernal pool complex during project construction.  
27 Mitigation Measure BIO-2b: *Avoid and Minimize Impacts on Terrestrial Biological Resources from*  
28 *Maintenance Activities* would reduce impacts on vernal pool complex during project maintenance. As  
29 described in Appendix 3F and Attachment 3F.1, under Mitigation Measure CMP: *Compensatory*  
30 *Mitigation Plan*, vernal pool complex would be created or acquired and permanently protected to  
31 compensate for project impacts from project construction and ensure no significant loss of vernal  
32 pool complex functions and values. The total acreage to be conserved would be based on the criteria  
33 presented in the CMP. Therefore, the impacts on vernal pool complex from the project alternatives  
34 would be less than significant with mitigation.

#### 35 **Mitigation Measure BIO-2a: Avoid or Minimize Impacts on Special-Status Natural** 36 **Communities and Special-Status Plants**

37 See description of Mitigation Measure BIO-2a under Impact BIO-2.

1           **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
2           **Resources from Maintenance Activities**

3           See description of Mitigation Measure BIO-2a under Impact BIO-2.

4           **Mitigation Measure CMP: Compensatory Mitigation Plan**

5           DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to  
6           offset the loss of vernal pool complex by purchasing credits at an agency-approved mitigation  
7           bank or at a non-bank site approved by the agencies supporting and implementing the design  
8           commitments and guidelines for special-status plants (Appendix 3F, Section 3F.3.2.4 and  
9           Attachment 3F.1, Table 3F.1-2, CMP-8: *Vernal Pool Complex*).

10          ***Mitigation Impacts***

11          As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
12          mitigation measure impacts. The analyses below consider the potential impacts associated with  
13          implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
14          Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
15          *Measures*.

16          *Compensatory Mitigation*

17          Implementation of the CMP on Bouldin Island and the I-5 ponds would not result in impacts on  
18          vernal pool complex (Appendix 13C, Table 13C-20). However, implementation of the CMP could  
19          result in impacts on vernal pool complex through tidal wetland habitat restoration and channel  
20          margin enhancement because potential areas identified for restoration include the Cache Slough  
21          Complex and Yolo Bypass (Appendix 3F, Section 3F.4.3.4.2, *Site Selection Criteria and Tools*), which  
22          occur adjacent to areas of vernal pool complex. Grading and fill to support these activities could  
23          directly affect habitat or result in changes to topography and soils such that the hydrology of vernal  
24          pool complex could be adversely affected.

25          In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
26          enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in the temporary  
27          disturbance of existing vernal pool complexes but would ultimately in a benefit to the community.  
28          Site-specific analyses are not provided because locations of potential non-bank sites are not  
29          currently known.

30          Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
31          crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
32          management of agricultural areas but may also include natural communities in the study area  
33          (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
34          *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
35          CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
36          CMP-22b: *Tricolored Blackbird Foraging Habitat*). Vernal pool complexes would not be targeted for  
37          these specific site protection instruments so there would not likely be any effects on this community.  
38          Site-specific analyses are not provided because locations of potential protection instruments are not  
39          currently known.

40          Temporary disturbances and indirect impacts on vernal pool complex would be reduced by  
41          Environmental Commitment EC-14: *Construction Best Management Practices for Biological*

1 *Resources*. Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status Natural*  
2 *Communities and Special-Status Plants*, Mitigation Measure BIO-2b: *Avoid and Minimize Impacts on*  
3 *Terrestrial Biological Resources from Maintenance Activities*, and Mitigation Measure CMP:  
4 *Compensatory Mitigation Plan* (Attachment 3F.1) would reduce this impact to a less-than-significant  
5 level with mitigation.

6 The impacts on vernal pool complex from the project alternatives with the CMP would be less than  
7 significant with mitigation.

#### 8 *Other Mitigation Measures*

9 Some mitigation measures would have impacts on vernal pool complex similar to those described  
10 under Impact BIO-7: *Impacts of the Project on Alkaline Seasonal Wetland Complex*. The impacts of  
11 habitat loss, ground disturbance, and exposure to hazardous materials on vernal pool complex  
12 would be reduced through the CMP, environmental commitments, and mitigation measures as  
13 detailed under Impact BIO-7: *Impacts of the Project on Alkaline Seasonal Wetland Complex*.  
14 Therefore, impacts on vernal pool complex from implementation of other mitigation measures  
15 would be reduced to less than significant.

16 Overall, the impacts on vernal pool complex from construction of compensatory mitigation and  
17 implementation of other mitigation measures, combined with project alternatives, would still be less  
18 than significant with mitigation.

### 19 **13.3.3 Impacts of the Project Alternatives on Special-Status Plant** 20 **Species**

21 The methods for analyzing effects on special-status plants appear in Section 13.3.1, *Methods for*  
22 *Analysis*. Impacts on plants would be considered significant if they have a substantial adverse effect,  
23 either directly or through habitat modifications, on any species identified as a candidate, sensitive,  
24 or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.  
25 For this analysis, a *substantial adverse effect* is defined as a permanent net loss of individual plants  
26 within a population or habitat loss within a population of a special-status plant.

27 An initial list of all special-status plants with potential to occur in or near the study area was  
28 compiled to identify which species could be affected by the project (Appendix 13A, *Special-Status*  
29 *Species with Potential to Occur in the Study Area*). From this list, 29 special-status plants species that  
30 could be affected were identified. For each species, the project footprint was overlain on a map of  
31 the known occurrences, and occurrences intersected by the project footprint were considered to be  
32 affected. In addition, for each species, a habitat model was created to identify areas where the  
33 project alternatives could potentially affect unknown species occurrences. The models are not  
34 intended to identify locations where impacts would occur, but rather to characterize potential  
35 impacts and to identify locations where preconstruction surveys would be focused. These 29 species  
36 are discussed below according to the plant communities they are associated with.

#### 37 **Impact BIO-9: Impacts of the Project on Special-Status Vernal Pool Plants**

38 Information on the special-status vernal pool plants' life history and habitat suitability models are  
39 presented in the following species accounts in Appendix 13B: Section 13B.8, *Dwarf Downingia*,  
40 Section 13B.11, *Spiny-Sepaled Button-Celery*, Section 13B.16, *Legenere*, Section 13B.30.4, *Hogwallow*  
41 *Starfish*, and Section 13B.30.8, *Delta Woolly Marbles*.

1 **All Project Alternatives**

2 **Construction**

3 None of the project alternatives would affect known occurrences of dwarf downingia, spiny-sepaled  
4 button-celery, legenera, hogwallow starfish, or Delta woolly marbles (Tables 13-15 through 13-18).

5 **Table 13-15. Impacts on Dwarf Downingia by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat (acres) in Project Footprint	Occurrences in Study Area	Occurrences Affected
1, 2a, 2c, 3, 4a, 4c, 5	12,302	0.32	6	0
2b, 4b	12,302	0.00	6	0

6

7 **Table 13-16. Impacts Spiny-Seпаled Button-Celery by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat (acres) in Project Footprint	Occurrences in Study Area	Occurrences Affected
1, 2a, 2b, 2c, 3, 4a, 4b, 4c	565	17.85	1	0
5	565	0.36	1	0

8

9 **Table 13-17. Impacts on Legenera by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat (acres) in Project Footprint	Occurrences in Study Area	Occurrences Affected
1, 2a, 2c, 3, 4a, 4c, 5	11,987	0.32	5	0
2b, 4b	11,987	0.00	5	0

10

11 **Table 13-18. Impacts on Hogwallow Starfish and Delta Woolly Marbles by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat (acres) in Project Footprint	Estimated Occurrences in Study Area <sup>a</sup>	Occurrences Affected
1, 2a, 2c, 3, 4a, 4c	1,253	19.17	3	0
2b, 4b	1,253	18.85	3	0
5	1,253	26.08	3	0

12 <sup>a</sup> Estimated due to non-specificity of occurrence locations.

13 There are 12,302 acres of modeled habitat for dwarf downingia in the study area. Alternatives 1, 2a,  
14 2c, 3, 4a, 4c, and 5 intersect a small amount of modeled habitat for dwarf downingia (Table 13-15).  
15 The primary project features intersecting modeled habitat are roads. Alternatives 2b and 4b do not  
16 intersect modeled habitat for dwarf downingia.

17 There are 565 acres of modeled habitat for spiny-sepaled button-celery in the study area.  
18 Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c intersect the most modeled habitat for spiny-sepaled  
19 button-celery (Table 13-16). Alternative 5 intersects the least amount of modeled habitat (Table 13-  
20 16). Project features crossing modeled habitat include roads and the Southern Forebay.

1 Constructing these facilities could potentially affect spiny-sepaed button-celery plants and their  
2 habitat.

3 There are 11,987 acres of modeled habitat for legenera in the study area. Alternatives 1, 2a, 2c, 3, 4a,  
4 4c, and 5 intersect a very small amount of modeled habitat for legenera (Table 13-17). The primary  
5 project features intersecting modeled habitat are roads. Alternatives 2b and 4b do not intersect  
6 modeled habitat for legenera.

7 There are 1,253 acres of modeled habitat for hogwallow starfish and Delta woolly marbles in the  
8 study area. Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c would have access roads intersecting modeled  
9 habitat for these species (Table 13-18). The Bethany Complex under Alternative 5 would intersect  
10 modeled habitat for these species and would result in slightly more impacts than the other  
11 alternatives (Table 13-18).

12 Field investigations would be conducted prior to and during construction under all project  
13 alternatives to more specifically identify appropriate construction methods and design criteria  
14 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
15 existing utilities, and address the establishment of geological and groundwater monitoring  
16 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
17 would involve a variety of ground-disturbing activities that would vary in duration from several  
18 hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
19 Construction Authority 2022a, 2022b), and could result in impacts on special-status vernal pool  
20 plants. Geotechnical investigations that would occur in the West Tracy Fault Study area and over the  
21 tunnel alignment footprints, which include test trenches, CPTs, soil borings, and geophysical arrays,  
22 would result in impacts on modeled habitat for hogwallow starfish, Delta woolly marbles, and spiny-  
23 sepaed button-celery (Appendix 13C); however, no modeled habitat for dwarf downingia and  
24 legenera would be affected. The Bethany Fault Study investigations would not affect modeled  
25 habitat for special-status vernal pool plants. The following field investigations would be conducted  
26 within proposed surface construction footprints of project facilities (including portions of tunnel  
27 alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT,  
28 groundwater testing and monitoring, monument installation, pilot studies for settlement, agronomic  
29 testing, and utility potholing. These temporary impacts are not characterized as an additional loss of  
30 habitat because impacts for these locations have already been quantified within the construction  
31 footprint. Environmental Commitments EC-1: *Conduct Worker Awareness Training* and EC-14:  
32 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these  
33 potential impacts by training construction staff on protecting sensitive biological resources,  
34 reporting requirements, and the ramifications for not following these measures and by having a  
35 biological monitor present to ensure that non-disturbance buffers and associated construction  
36 fencing are intact and all other protective measures are being implemented where applicable.

### 37 Operations

38 Project operations would not occur in vernal pool habitat and would have no effects on special-  
39 status vernal pool plants.

### 40 Maintenance

41 Project maintenance of aboveground water conveyance facilities for all project alternatives would  
42 not occur in vernal pool habitat but could result in impacts on special-status vernal pool plants,  
43 when habitat occurs adjacent to facilities. Maintenance activities across all facilities that could affect

1 this community include repaving of access roads every 15 years and semiannual general and ground  
2 maintenance (e.g., mowing, vegetation trimming, herbicide application). These activities also create  
3 the potential for runoff of paving material or materials from parked vehicles or staging areas.

#### 4 ***CEQA Conclusion—All Project Alternatives***

5 No project alternatives would have impacts on known occurrences of dwarf downingia, spiny-  
6 sepaled button-celery, legenera, hogwallow starfish, or Delta woolly marbles.

7 Alternatives 1, 2a, 2c, 3, 4a, and 4c would intersect modeled habitat for dwarf downingia, and  
8 legenera. All project alternatives would intersect modeled habitat for spiny-sepaled button-celery.  
9 Project construction under these alternatives could cause a net loss of individual plants (take) or  
10 habitat loss within an occurrence of a rare and endangered plant if the species is present. Because  
11 dwarf downingia, spiny-sepaled button-celery are moderately threatened in California and legenera  
12 is seriously threatened in California, these impacts would represent a substantial loss and would be  
13 significant.

14 All project alternatives intersect modeled habitat for hogwallow starfish and could adversely affect  
15 unknown occurrences. Hogwallow starfish is a regionally rare taxon in Alameda and Contra Costa  
16 Counties (California Native Plant Society 2021), and it is associated with a habitat that has  
17 substantially declined in California. Therefore, the project's impacts on hogwallow starfish would be  
18 significant.

19 All project alternatives intersect modeled habitat for Delta woolly marbles and could adversely  
20 affect unknown occurrences. Delta woolly marbles is a regionally rare taxon in Alameda and Contra  
21 Costa Counties (California Native Plant Society 2021), and it is associated with a habitat that has  
22 substantially declined in California. Therefore, the project's impacts on Delta woolly marbles would  
23 be significant.

24 Temporary disturbances and indirect impacts on special-status vernal pool plants would be reduced  
25 by Environmental Commitment EC-14: *Construction Best Management Practices for Biological*  
26 *Resources*. Even with this environmental commitment, however, the effects on vernal pool plants  
27 from construction and potential impacts from maintenance activities would be significant.  
28 Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status Natural Communities and*  
29 *Special-Status Plants* would reduce impacts on special-status vernal pool plants during project  
30 construction. Mitigation Measure BIO-2b: *Avoid and Minimize Impacts on Terrestrial Biological*  
31 *Resources from Maintenance Activities* would reduce impacts on special-status vernal pool plants  
32 during project maintenance. Under Mitigation Measure CMP: *Compensatory Mitigation Plan*, habitat  
33 for special-status vernal pool plants would be created and permanently protected or mitigation  
34 credits would be acquired to compensate for project impacts and ensure no significant loss of  
35 habitat, as described in Appendix 3F and Attachment 3F.1. Therefore, the project's impacts on  
36 special-status vernal pool plants would be less than significant with mitigation.

#### 37 **Mitigation Measure BIO-2a: Avoid or Minimize Impacts on Special-Status Natural** 38 **Communities and Special-Status Plants**

39 See description of Mitigation Measure BIO-2a under Impact BIO-2.

1           **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
2           **Resources from Maintenance Activities**

3           See description of Mitigation Measure BIO-2a under Impact BIO-2.

4           **Mitigation Measure CMP: Compensatory Mitigation Plan**

5           DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to  
6           offset the loss of vernal pool complex by purchasing credits at an agency-approved mitigation  
7           bank or through the use of site protection instruments, such as conservation easements, at a  
8           non-bank site approved by the agencies and supporting and implementing the design  
9           commitments and guidelines for special-status plants (Appendix 3F, Section 3F.3.2.4 and  
10          Attachment 3F.1, Table 3F.1-3, CMP-9: *Special-Status Plants*).

11          ***Mitigation Impacts***

12          As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
13          mitigation measure impacts. The analyses below consider the potential impacts associated with  
14          implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
15          Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
16          *Measures*.

17          *Compensatory Mitigation*

18          Compensatory mitigation through the construction of the proposed initial mitigation sites on  
19          Bouldin Island and at the I-5 ponds would not affect any known occurrences of dwarf downingia,  
20          spiny-sepaed button-celery, legenere, hogwallow starfish, or Delta woolly marbles, and the  
21          construction footprint of the compensatory habitat does not intersect modeled habitat for any of  
22          these species (Appendix 13C, Table 13C-10). However, implementation of the CMP could result in  
23          impacts on special-status vernal pool plants through tidal wetland habitat restoration and channel  
24          margin enhancement because potential areas identified include the Cache Slough Complex and Yolo  
25          Bypass (Appendix 3F, Section 3F.4.3.4.2, *Site Selection Criteria and Tools*), which are adjacent to  
26          modeled habitat for special-status vernal pool plants and several records of the species that occur in  
27          these general areas. Tidal restoration activities could also result in impacts on Solano grass, Colusa  
28          grass, and Boggs Lake hedge hyssop if these activities take place in the Cache Slough Complex within  
29          or adjacent to Jepson Prairie, which is an area with habitat and known records for these vernal pool  
30          plant species (Appendix 13A). The extent of habitat within the range of these species in the study  
31          area is roughly equivalent to the modeled habitat for delta green ground beetle depicted in  
32          Appendix 13B, Figure 13B.40-1. Grading and fill to support these activities could directly affect  
33          habitat or result in changes to topography and soils such that the hydrology of vernal pools  
34          supporting these species is altered.

35          In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
36          enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in impacts on special-  
37          status vernal pool plants. Site-specific analyses are not provided because locations of potential non-  
38          bank sites are not currently known.

39          Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
40          crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
41          management of agricultural areas but may also include natural communities in the study area

1 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
2 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
3 *CMP-19b: Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
4 *CMP-22b: Tricolored Blackbird Foraging Habitat*). Vernal pool complexes would not be targeted for  
5 these specific site protection instruments so there would not likely be any effects on special-status  
6 vernal pool plants. Site-specific analyses are not provided because locations of potential protection  
7 instruments are not currently known.

8 Temporary disturbances and indirect impacts on special-status vernal pool plants would be reduced  
9 by Environmental Commitment EC-14: *Construction Best Management Practices for Biological*  
10 *Resources*. Implementing Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status*  
11 *Natural Communities and Special-Status Plants*, Mitigation Measure BIO-2b: *Avoid and Minimize*  
12 *Impacts on Terrestrial Biological Resources from Maintenance Activities*, and Mitigation Measure  
13 *CMP: Compensatory Mitigation Plan* would reduce this impact to a less-than-significant level with  
14 mitigation.

15 The impacts on special-status vernal pool plants from the project alternatives with the CMP would  
16 be less than significant with mitigation.

#### 17 Other Mitigation Measures

18 Some mitigation measures would have impacts on special-status vernal pool plants similar to those  
19 described under Impact BIO-8: *Impacts of the Project on Vernal Pool Complex*. The impacts of habitat  
20 loss, ground disturbance, and exposure to hazardous materials on special-status vernal pool plants  
21 would be reduced through the CMP, environmental commitments, and mitigation measures as  
22 detailed under Impact BIO-7: *Impacts of the Project on Alkaline Seasonal Wetland Complex*.  
23 Therefore, impacts on special-status vernal pool plants from implementation of other mitigation  
24 measures would be reduced to less than significant.

25 Overall, the impacts on special-status vernal pool plants from construction of compensatory  
26 mitigation and implementation of other mitigation measures, combined with project alternatives,  
27 would still be less than significant with mitigation.

#### 28 **Impact BIO-10: Impacts of the Project on Special-Status Alkaline Seasonal Wetland Complex** 29 **Plants**

30 Information on the alkaline seasonal wetland complex species' life history and habitat suitability  
31 models are presented in the following species accounts in Appendix 13B: Section 13B.1, *Alkali Milk-*  
32 *Vetch*, Section 13B.2, *Brittlescale*, Section 13B.7, *Recurved Larkspur*, Section 13B.13, *San Joaquin*  
33 *Spearscale*, Section 13B.22, *California Alkali Grass*, Section 13B.26, *Long-Styled Sand-Spurrey*, and  
34 Section 13B.30.1, *Crownscale*.

#### 35 **All Project Alternatives**

##### 36 Construction

37 Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c could remove known occupied habitat for recurved  
38 larkspur, San Joaquin spearscale, long-styled sand-spurrey, and crownscale. Alternative 5 could  
39 remove known occupied habitat for long-styled sand-spurrey. These alternatives could impact  
40 recurved larkspur, San Joaquin spearscale, long-styled sand-spurrey, and crownscale through loss of



1 individual plants and occupied habitat. No known occurrences of alkali milk-vetch, brittlescale,  
2 California alkali grass, Ferris' goldfields, or little mousetail would be affected.

3 All project alternatives also intercept modeled habitat for alkali milk-vetch, brittlescale, recurved  
4 larkspur, San Joaquin spearscale, long-styled sand-spurrey, California alkali grass, crownscale,  
5 Ferris' goldfields, and little mousetail. Locations where the project footprint crosses modeled habitat  
6 identify where the highest potential for impacts on undocumented occurrences of these species  
7 could occur. Road construction crosses modeled habitat for all nine special-status alkaline seasonal  
8 wetland plant species. The outlet and control structure footprint intersects modeled habitat for  
9 alkali milk-vetch, recurved larkspur, and San Joaquin spearscale. Footprints for the forebay, shafts,  
10 and power transmission lines cross modeled habitat for San Joaquin spearscale. In general,  
11 Alternatives 1, 2a, 2b, 2c, 3 4a, 4b, and 4c intercept more modeled habitat for these species than  
12 Alternative 5. The amount of modeled habitat intercepted differs among alternatives and among  
13 species. Potential project impacts on special-status alkaline seasonal wetland plants are summarized  
14 in Tables 13-19 through 13-27.

15 **Table 13-19. Impacts on Alkali Milk-Vetch by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2b, 2c, 3, 4b, 4c	10,782	46.78	14	0
2a, 4a	10,782	45.56	14	0
5	10,782	21.53	14	0

16  
17 **Table 13-20. Impacts on Brittlescale by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2a, 2b, 2c, 3, 4a, 4b, 4c	4,976	16.80	4	0
5	4,976	0.14	4	0

18  
19 **Table 13-21. Impacts on Recurved Larkspur by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2b, 2c, 3, 4b, 4c	836	25.21	4	1
2a, 4a	836	23.66	4	1
5	836	0.14	4	0

20  
21 **Table 13-22. Impacts on San Joaquin Spearscale by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2b, 2c	27,430	122.53	11	2
2a	27,430	200.78	11	2
3, 4b, 4c	27,430	123.87	11	2

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
4a	27,430	202.12	11	2
5	27,430	96.04	11	0

1

2 **Table 13-23. Impacts on Long-Styled Sand-Spurrey by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2a, 2b, 2c, 3, 4a, 4b, 4c	2,846	16.39	6	3
5	2,846	0.14	6	1

3

4 **Table 13-24. Impacts on California Alkali Grass by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2a, 2b, 2c, 3, 4a, 4b, 4c	596	5.82	2	0
5	596	0.19	2	0

5

6 **Table 13-25. Impacts on Crownscale by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2a, 2b, 2c, 3, 4a, 4b, 4c	468	4.76	5	1
5	468	0.76	5	0

7

8 **Table 13-26. Impacts on Ferris' Goldfields by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2a, 2b, 2c, 3, 4a, 4b, 4c	468	4.76	4	0
5	468	0.76	4	0

9

10 **Table 13-27. Impacts on Little Mousetail by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2a, 2b, 2c, 3, 4a, 4b, 4c	468	4.76	1	0
5	468	0.76	1	0

11

12 Field investigations would be conducted prior to and during construction under all project  
 13 alternatives to more specifically identify appropriate construction methods and design criteria  
 14 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
 15 existing utilities, and address the establishment of geological and groundwater monitoring

1 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field  
2 investigations. Field investigations would involve a variety of ground-disturbing activities that  
3 would vary in duration from several hours to approximately 6 weeks (Section 3.15, *Field*  
4 *Investigations*; Delta Conveyance Design and Construction Authority 2022a, 2022b) and could result  
5 in impacts on special-status alkaline seasonal wetland complex plants. Geotechnical investigations  
6 associated with the tunnels for all project alternatives, which include CPTs and soil borings, would  
7 result in impacts on modeled habitat for alkali milk-vetch, California alkali grass, brittlescale,  
8 crownscale, Ferris' goldfields, little mousetail, long-styled sand-spurrey, recurved larkspur, and San  
9 Joaquin spearscale (Appendix 13C). West Tracy Fault Study investigations, which involve test  
10 trenches, CPTs, soil borings, and geophysical arrays, would result in impacts on modeled habitat for  
11 alkali milk-vetch, long-styled sand-spurrey, recurved larkspur, and San Joaquin spearscale  
12 (Appendix 13C). The Bethany Fault Study geotechnical investigations (Alternative 5) would be  
13 completed in a single day and would involve placing approximately 20 ERT probes 0.5 inch in  
14 diameter. The study would be conducted entirely on foot, perpendicular to the tunneled portion of  
15 the Bethany Reservoir Aqueduct (Delta Conveyance Design and Construction Authority 2022a,  
16 2022b). Because of the small footprint and the short (1-day) duration of the Bethany Fault Study,  
17 impacts on modeled habitat are not quantified; however, they would occur within modeled habitat  
18 for San Joaquin spearscale. The following field investigations would be conducted within proposed  
19 surface construction footprints (including portions of tunnel alignments), and would temporarily  
20 affect habitat: test trenches, CPTs, soil borings, ERT, groundwater testing and monitoring,  
21 monument installation, pilot studies for settlement, agronomic testing, and utility potholing. These  
22 temporary impacts are not characterized as an additional loss of habitat because impacts for these  
23 locations have already been quantified within the construction footprint. Environmental  
24 Commitments EC-1: *Conduct Worker Awareness Training* and EC-14: *Construction Best Management*  
25 *Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by training  
26 construction staff on protecting sensitive biological resources, reporting requirements, and the  
27 ramifications for not following these measures and by having a biological monitor present to ensure  
28 that non-disturbance buffers and associated construction fencing are intact and all other protective  
29 measures are being implemented where applicable.

### 30 Operations

31 Project operations would not occur in alkaline seasonal wetland habitat and would have no effects  
32 on special-status alkaline seasonal wetland complex plants.

### 33 Maintenance

34 Project maintenance of aboveground water conveyance facilities for all project alternatives would  
35 not occur in alkali seasonal wetland habitat but could result in impacts on special-status alkaline  
36 seasonal wetland plants when habitat occurs adjacent to facilities. Maintenance activities across all  
37 facilities that could affect this community include repaving of access roads every 15 years and  
38 semiannual general and ground maintenance (e.g., mowing, vegetation trimming, herbicide  
39 application). These activities also create the potential for runoff of paving material or materials from  
40 parked vehicles or staging areas.

### 41 **CEQA Conclusion—All Project Alternatives**

42 The project alternatives would cause the permanent removal of all or parts of occurrences of  
43 recurved larkspur, San Joaquin spearscale, and long-styled sand-spurrey and would intersect

1 modeled habitat for all three species. The project alternatives would not affect occurrences of alkali  
2 milk-vetch, brittlescale, or California alkali grass, but would intersect modeled habitat for all three  
3 species. Because this impact would result in a net loss of individual plants (take) or habitat loss  
4 within populations of rare and endangered plant species, these losses would be substantial and  
5 would be a significant impact.

6 Most project alternatives (1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) would result in the loss of one crownscale  
7 occurrence. All alternatives intersect modeled habitat and could adversely affect unknown  
8 crownscale occurrences. Crownscale is a regionally rare taxon in Alameda and Contra Costa  
9 Counties (California Native Plant Society 2021). Populations in the study area are significant  
10 because they are at the northern periphery of the species' range and occur in alkaline habitats that  
11 have declined substantially in California. Therefore, the project's impacts on crownscale would be  
12 significant.

13 The project would not affect any known occurrences of Ferris' goldfields. However, all alternatives  
14 intersect modeled habitat and could adversely affect unknown Ferris' goldfields occurrences. Ferris'  
15 goldfields is a regionally rare taxon in Alameda and Contra Costa Counties (California Native Plant  
16 Society 2021), and it is associated with a habitat that has substantially declined in California.  
17 Populations in the study area are at the northern periphery of the species' range, where it is  
18 particularly uncommon. Therefore, the project's impacts on Ferris' goldfields would be significant.

19 The project would not affect any known occurrences of little mousetail. However, all project  
20 alternatives intersect modeled habitat and could adversely affect unknown little mousetail  
21 occurrences. Little mousetail is a regionally rare taxon in Alameda and Contra Costa Counties  
22 (California Native Plant Society 2021), and it is associated with a habitat that has substantially  
23 declined in California. Therefore, the project's impacts on little mousetail would be significant.

24 Temporary disturbances and indirect impacts special-status alkaline seasonal wetland complex  
25 plants would be reduced by Environmental Commitment EC-14: *Construction Best Management*  
26 *Practices for Biological Resources*. Even with this environmental commitment, however, the loss of  
27 alkaline wetland plants from construction and potential impacts from maintenance activities would  
28 be significant. Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status Natural*  
29 *Communities and Special-Status Plants*, would reduce impacts on special-status alkaline seasonal  
30 wetland complex plants during project construction. Mitigation Measure BIO-2b: *Avoid and Minimize*  
31 *Impacts on Terrestrial Biological Resources from Maintenance Activities* would reduce impacts on  
32 special-status alkaline seasonal wetland complex plants during project maintenance. Under  
33 Mitigation Measure CMP: *Compensatory Mitigation Plan*, habitat for special-status alkaline seasonal  
34 wetland plants would be created and permanently protected or mitigation credits would be  
35 acquired to compensate for project impacts and ensure no significant loss of habitat, as described in  
36 Appendix 3F, and Attachment 3F.1. Therefore, the project's impacts on special-status alkaline  
37 seasonal wetland plants would be less than significant with mitigation.

### 38 **Mitigation Measure BIO-2a: Avoid or Minimize Impacts on Special-Status Natural** 39 **Communities and Special-Status Plants**

40 See description of Mitigation Measure BIO-2a under Impact BIO-2.

1           **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
2           **Resources from Maintenance Activities**

3           See description of Mitigation Measure BIO-2a under Impact BIO-2.

4           **Mitigation Measure CMP: Compensatory Mitigation Plan**

5           DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to  
6           offset the loss of alkaline seasonal wetland complex by purchasing credits at an agency-  
7           approved mitigation bank or through the use of site protection instruments, such as  
8           conservation easements, at a non-bank site approved by the agencies and supporting and  
9           implementing the design commitments and guidelines for special-status plants (Appendix 3F,  
10          Section 3F.3.2.4 and Attachment 3F.1, Table 3F.1-2, CMP-7: *Alkaline Seasonal Wetland Complex*)  
11          and Table 3F.1-3, CMP-9: *Special-Status Plants*).

12          ***Mitigation Impacts***

13          As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
14          mitigation measure impacts. The analyses below consider the potential impacts associated with  
15          implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
16          Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
17          *Measures*.

18          *Compensatory Mitigation*

19          Compensatory mitigation on Bouldin Island and the I-5 ponds would not occur in alkaline seasonal  
20          wetlands and would not affect any known occurrences of special-status alkaline seasonal wetland  
21          plant species. In addition, the construction footprint for the compensatory habitat does not intersect  
22          modeled habitat for any of these species (Appendix 13C, Table 13C-10). However, implementation of  
23          the CMP could result in impacts on special-status alkaline seasonal wetland plants through tidal  
24          wetland habitat restoration and channel margin enhancement because potential areas identified  
25          include the Cache Slough Complex and Yolo Bypass (Appendix 3F, Section 3F.4.3.4.2 Site Selection  
26          Criteria and Tools), which are adjacent to modeled habitat for special-status alkaline seasonal  
27          wetland plants and several records of the species that occur in these general areas. Grading and fill  
28          to support these activities could directly affect habitat or result in changes to topography and soils  
29          such that the hydrology of alkaline seasonal wetlands supporting these species is altered.

30          In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
31          enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in impacts on special-  
32          status alkaline seasonal wetland plants. Site-specific analyses are not provided because locations of  
33          potential non-bank sites are not currently known.

34          Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
35          crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
36          management of agricultural areas but may also include natural communities in the study area  
37          (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
38          *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
39          CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
40          CMP-22b: *Tricolored Blackbird Foraging Habitat*). Alkaline seasonal wetland complexes would not  
41          be targeted for these specific site protection instruments so there would not likely be any effects on

1 special-status alkaline seasonal wetland plants. Site-specific analyses are not provided because  
2 locations of potential protection instruments are not currently known.

3 Temporary disturbances and indirect impacts on special-status alkaline seasonal wetland plants  
4 would be reduced by Environmental Commitment EC-14: *Construction Best Management Practices*  
5 *for Biological Resources*. Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status*  
6 *Natural Communities and Special-Status Plants*, Mitigation Measure BIO-2b: *Avoid and Minimize*  
7 *Impacts on Terrestrial Biological Resources from Maintenance Activities*, and Mitigation Measure  
8 *CMP: Compensatory Mitigation Plan* would reduce this impact to a less-than-significant level with  
9 mitigation.

10 The impacts on special-status alkaline seasonal wetland plants from the project alternatives with  
11 the CMP would be less than significant with mitigation.

### 12 Other Mitigation Measures

13 Some mitigation measures would have impacts on special-status alkaline seasonal wetland complex  
14 plants similar to those described under Impact BIO-7: *Impacts of the Project on Alkaline Seasonal*  
15 *Wetland Complex*. The impacts of habitat loss, ground disturbance, and exposure to hazardous  
16 materials on special-status alkaline seasonal wetland complex plants would be reduced through the  
17 CMP, environmental commitments, and mitigation measures as detailed under Impact BIO-7:  
18 *Impacts of the Project on Alkaline Seasonal Wetland Complex*. Therefore, impacts on special-status  
19 alkaline seasonal wetland complex plants from implementation of other mitigation measures would  
20 be reduced to less than significant.

21 Overall, the impacts on special-status alkaline seasonal wetland complex plants from construction of  
22 compensatory mitigation and implementation of other mitigation measures, combined with project  
23 alternatives, would still be less than significant with mitigation.

### 24 **Impact BIO-11: Impacts of the Project on Special-Status Grassland Plants**

25 Information on the special-status grassland species' life history and habitat suitability models are  
26 presented in the following species accounts in Appendix 13B: Section 13B.9, *Jepson's Coyote-Thistle*,  
27 Section 13B.12, *Diamond-Petaled California Poppy*, Section 13B.17, *Heckard's Peppergrass*, Section  
28 13B.20, *Shining Navarretia*, Section 13B.28, *Saline Clover*, Section 13B.29, *Caper-Fruited*  
29 *Tropidocarpum*, Section 13B.30.2, *Small-Flowered Morning-Glory*, and Section 13B.30.7, *Cotula*  
30 *Navarretia*.

### 31 **All Project Alternatives**

#### 32 Construction

33 No project alternatives would affect known occurrences of Jepson's coyote-thistle, diamond-petaled  
34 California poppy, Heckard's peppergrass, shining navarretia, saline clover, caper-fruited  
35 tropidocarpum, small-flowered morning-glory, stinkbells, or cotula navarretia.

36 However, the project would intersect modeled habitat for all of these species. Locations where the  
37 project footprint crosses modeled habitat identify where the highest potential for impacts on  
38 undocumented occurrences of these species could occur. If the modeled habitat is occupied, then  
39 project construction could cause the removal, habitat loss or conversion, and temporary disturbance  
40 of special-status grassland species. Project activities that intersect the greatest amount of modeled

1 habitat for diamond-petaled California poppy, shining navarretia, caper-fruited tropidocarpum,  
 2 small-flowered morning-glory, stinkbells, and cotula navarretia include construction of the outlet  
 3 and control structure under Alternatives 2a and 4a, and construction of access roads and an  
 4 aqueduct under Alternative 5. Project activities that intersect the greatest amount of modeled  
 5 habitat for Heckard's peppergrass and saline cover under Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c  
 6 are construction of the Byron Tract on-site access road, the realigned Byron Highway, and the  
 7 Southern Forebay. Project activities that intersect the greatest amount of modeled habitat for  
 8 Heckard's peppergrass and saline clover under Alternative 5 are construction of the Bethany  
 9 Reservoir Aqueduct. In general, Alternatives 1, 2b, 2c, 3, 4b, and 4c intersect the least amount of  
 10 modeled habitat for special-status grassland plants, and Alternatives 2a and 4a intersect the greatest  
 11 amount of modeled habitat for special-status grassland plants. Potential project impacts on special-  
 12 status grassland plants are summarized in Tables 13-28 through 13-36.

13 **Table 13-28. Impacts on Jepson's Coyote-Thistle by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2a, 2b, 2c, 3, 4a, 4b, 4c	9,065	0.56	2	0
5	9,065	0.18	2	0

14  
 15 **Table 13-29. Impacts on Diamond-Petaled California Poppy by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2b, 2c, 3, 4b, 4c	2,523	17.53	1	0
2a, 4a	2,523	79.38	1	0
5	2,523	34.92	1	0

16  
 17 **Table 13-30. Impacts on Heckard's Peppergrass by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2a, 2c, 3, 4a, 4c	12,831	21.14	5	0
2b, 4b	12,831	21.13	5	0
5	12,831	2.73	5	0

18  
 19 **Table 13-31. Impacts on Shining Navarretia by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2b, 2c, 3, 4b, 4c	7,896	17.53	0	0
2a, 4a	7,896	79.38	0	0
5	7,896	61.77	0	0

1 **Table 13-32. Impacts on Saline Clover by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2a, 2c, 3, 4a, 4c	14,790	22.67	7	0
2b, 4b	14,790	22.35	7	0
5	14,790	26.82	7	0

2

3 **Table 13-33. Impacts on Caper-Fruited Tropicarpum by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2b, 2c, 3, 4b, 4c	3,158	17.53	6	0
2a, 4a	3,158	79.38	6	0
5	3,158	61.77	6	0

4

5 **Table 13-34. Impacts on Small-Flowered Morning-Glory by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2b, 2c, 3, 4b, 4c	7,896	17.53	0	0
2a, 4a	7,896	79.38	0	0
5	7,896	61.77	0	0

6

7 **Table 13-35. Impacts on Stinkbells by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2b, 2c, 3, 4b, 4c	7,896	17.53	1	0
2a, 4a	7,896	79.38	1	0
5	7,896	61.77	1	0

8

9 **Table 13-36. Impacts on Cotula Navarretia by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2b, 2c, 3, 4b, 4c	7,896	17.53	3	0
2a, 4a	7,896	79.38	3	0
5	7,896	61.77	3	0

10

11 Field investigations would be conducted prior to and during construction under all project  
 12 alternatives to more specifically identify appropriate construction methods and design criteria  
 13 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
 14 existing utilities, and address the establishment of geological and groundwater monitoring



1 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
2 would involve a variety of ground-disturbing activities that would vary in duration from several  
3 hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
4 Construction Authority 2022a, 2022b), and could result in impacts on special-status grassland  
5 plants. Geotechnical investigations associated with the West Tracy Fault Study area and over the  
6 tunnel alignment footprints, which include test trenches, CPTs, soil borings, and geophysical arrays,  
7 would result in impacts on modeled habitat for saline clover and Heckard's peppergrass (Appendix  
8 13C). Geotechnical investigations associated with the tunnels for all alternatives would affect  
9 modeled habitat for Jepson's coyote-thistle (Appendix 13C). Geotechnical investigations associated  
10 with the tunnel for the Bethany Complex tunnel (Alternative 5) would affect modeled habitat for  
11 diamond-petaled California poppy, shining navarretia, caper-fruited tropidocarpum, small-flowered  
12 morning-glory, stinkbells, and cotula navarretia. The Bethany Fault Study geotechnical  
13 investigations (Alternative 5) would be completed in a single day and would involve placing  
14 approximately 20 ERT probes 0.5 inch in diameter. The study would be conducted entirely on foot,  
15 perpendicular to the tunneled portion of the Bethany Reservoir Aqueduct (Delta Conveyance Design  
16 and Construction Authority 2022a, 2022b). Because of the small footprint and the short (1-day)  
17 duration of the Bethany Fault Study, impacts on modeled habitat are not quantified, however they  
18 would occur within modeled habitat for diamond-petaled California poppy, shining navarretia,  
19 caper-fruited tropidocarpum, small-flowered morning-glory, stinkbells, and cotula navarretia. The  
20 following field investigations would be conducted within proposed surface construction footprints  
21 of project facilities (including portions of tunnel alignments) and would temporarily affect habitat:  
22 test trenches, CPTs, soil borings, ERT, groundwater testing and monitoring, monument installation,  
23 pilot studies for settlement, agronomic testing, and utility potholing. These temporary impacts are  
24 not characterized as an additional loss of habitat because impacts for these locations have already  
25 been quantified within the construction footprint. Environmental Commitments EC-1: *Conduct*  
26 *Worker Awareness Training* and EC-14: *Construction Best Management Practices for Biological*  
27 *Resources* (Appendix 3B) would reduce these potential impacts by training construction staff on  
28 protecting sensitive biological resources, reporting requirements, and the ramifications for not  
29 following these measures and by having a biological monitor present to ensure that non-disturbance  
30 buffers and associated construction fencing are intact and all other protective measures are being  
31 implemented where applicable.

### 32 Operations

33 Project operations would not occur in grassland habitat and would have no effects on special-status  
34 grassland plant species.

### 35 Maintenance

36 Project maintenance of aboveground water conveyance facilities for all project alternatives could  
37 result in impacts on special-status grassland plants. Maintenance activities across all facilities that  
38 could affect this community include repaving of access roads every 15 years and semiannual general  
39 and ground maintenance (e.g., mowing, vegetation trimming, herbicide application). These activities  
40 also create the potential for runoff of paving material or materials from parked vehicles or staging  
41 areas.

## 1 **CEQA Conclusion—All Project Alternatives**

2 Because all alternatives would cross modeled habitat for Jepson’s coyote-thistle, Heckard’s  
3 peppergrass, diamond-petaled California poppy, shining navarretia, saline cover, and caper-fruited  
4 troidocarpum, these alternatives could cause a net loss of individual plants (take) or habitat loss  
5 within an occurrence of a special-status plant. Because diamond-petaled California poppy and caper-  
6 fruited troidocarpum are both seriously threatened, and because Heckard’s peppergrass, Jepson’s  
7 coyote-thistle, shining navarretia, and saline clover are moderately threatened in California, these  
8 impacts would represent a substantial loss and would be a significant impact.

9 All alternatives intersect modeled habitat and could adversely affect unknown small-flowered  
10 morning-glory occurrences. Small-flowered morning-glory is a regionally rare taxon in Alameda and  
11 Contra Costa Counties (California Native Plant Society 2021). Populations in Contra Costa County  
12 are significant because they are at the northernmost periphery of the species’ range and because the  
13 species is much more uncommon at the northern end of its range than in the southern portion.  
14 Based on its rarity in the northern part of its range, the project’s impacts on small-flowered  
15 morning-glory would be significant.

16 All alternatives intersect modeled habitat and could adversely affect unknown stinkbells  
17 occurrences. Stinkbells is a regionally rare taxon in Alameda and Contra Costa Counties and is  
18 moderately endangered in California (California Native Plant Society 2021). Therefore, the project’s  
19 impacts on stinkbells would be significant.

20 All alternatives intersect modeled habitat and could adversely affect unknown cotula navarretia  
21 occurrences. Cotula navarretia is a regionally rare taxon in Alameda and Contra Costa Counties  
22 (California Native Plant Society 2021) and is moderately endangered in California (California Native  
23 Plant Society 2021). Therefore, the project’s impacts on cotula navarretia would be significant.

24 Temporary disturbances and indirect impacts on special-status grassland plants would be reduced  
25 by Environmental Commitment EC-14: *Construction Best Management Practices for Biological*  
26 *Resources*. Even with this environmental commitment, however, the loss of grassland plants from  
27 construction and potential impacts from maintenance activities would be significant. Mitigation  
28 Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status Natural Communities and Special-*  
29 *Status Plants* would reduce impacts on special-status grassland plants during project construction.  
30 Mitigation Measure BIO-2b: *Avoid and Minimize Impacts on Terrestrial Biological Resources from*  
31 *Maintenance Activities* would reduce impacts on special-status grassland plants during project  
32 maintenance. Under Mitigation Measure CMP: *Compensatory Mitigation Plan*, habitat for special-  
33 status grassland plants would be created and permanently protected or mitigation credits would be  
34 acquired to compensate for project impacts and to ensure no significant loss of habitat. Therefore,  
35 the project’s impacts on special-status grassland plants would be less than significant with  
36 mitigation.

### 37 **Mitigation Measure BIO-2a: Avoid or Minimize Impacts on Special-Status Natural** 38 **Communities and Special-Status Plants**

39 See description of Mitigation Measure BIO-2a under Impact BIO-2.

### 40 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 41 **Resources from Maintenance Activities**

42 See description of Mitigation Measure BIO-2a under Impact BIO-2.

## 1           **Mitigation Measure CMP: Compensatory Mitigation Plan**

2           Through the CMP (see Impact BIO-1 for a summary discussion of the CMP), DWR would  
3           implement the design commitments and guidelines for restoring suitable habitat for special-  
4           status plants (Appendix 3F, Attachment 3F.1, Table 3F.1-3, CMP-9: *Special-Status Plants*).

### 5           ***Mitigation Impacts***

6           As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
7           mitigation measure impacts. The analyses below consider the potential impacts associated with  
8           implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
9           Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
10          *Measures*.

### 11          *Compensatory Mitigation*

12          Compensatory mitigation on Bouldin Island and at the I-5 ponds would not affect any known  
13          occurrences of Jepson's coyote-thistle, diamond-petaled California poppy, Heckard's peppergrass,  
14          shining navarretia, saline clover, caper-fruited tropidocarpum, small-flowered morning-glory,  
15          stinkbells, or cotula navarretia, and the construction footprint of the compensatory mitigation site  
16          does not intersect modeled habitat for any of these species (Appendix 13C, Table 13C-10). Tidal  
17          wetland habitat restoration and channel margin enhancement under the CMP could result in  
18          impacts on special-status grassland plants because potential areas identified include the Cache  
19          Slough Complex and Yolo Bypass (Appendix 3F, Section 3F.4.3.4.2, Site Selection Criteria and Tools),  
20          which are adjacent to modeled habitat for these species and several records of the species that occur  
21          in these general areas. Grading and fill to support these activities could directly affect habitat.

22          In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
23          enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in impacts on special-  
24          status grassland plants if creation and enhancement occurs in grasslands supporting these plants.  
25          Site-specific analyses are not provided because locations of potential non-bank sites are not  
26          currently known.

27          Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
28          crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
29          management of agricultural areas but may also include natural communities in the study area  
30          (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
31          *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
32          CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
33          CMP-22b: *Tricolored Blackbird Foraging Habitat*). Except for croplands, some areas could potentially  
34          contain grassland but management activities in these areas would be limited in scope and would not  
35          likely involve physical changes to this community. Site-specific analyses are not provided because  
36          locations of potential protection instruments are not currently known.

37          The impacts on special-status grassland plants from the project alternatives with the CMP would be  
38          less than significant with mitigation.

### 39          *Other Mitigation Measures*

40          Some mitigation measures would have impacts on special-status grassland plants similar to those  
41          described under Impact BIO-7: *Impacts of the Project on Alkaline Seasonal Wetland Complex*. The

1 impacts of habitat loss, ground disturbance, and exposure to hazardous materials on special-status  
 2 grassland plants would be reduced through the CMP, environmental commitments, and mitigation  
 3 measures as detailed under Impact BIO-7: *Impacts of the Project on Alkaline Seasonal Wetland*  
 4 *Complex*. Therefore, impacts on special-status grassland plants from implementation of other  
 5 mitigation measures would be reduced to less than significant.

6 Overall, the impacts on special-status grassland plants from construction of compensatory  
 7 mitigation and implementation of other mitigation measures, combined with project alternatives,  
 8 would still be less than significant with mitigation.

### 9 **Impact BIO-12: Impacts of the Project on Tidal Freshwater Emergent Wetland Plants**

10 Information on the tidal freshwater emergent wetland plants' life history and habitat suitability  
 11 models are presented in the following species accounts in Appendix 13B: Section 13B.4, *Bristly*  
 12 *Sedge*, Section 13B.6, *Bolander's Water-Hemlock*, Section 13B.14, *Woolly Rose-Mallow*, Section  
 13 13B.15, *Delta Tule Pea*, Section 13B.18, *Mason's Lilaeopsis*, Section 13B.19, *Delta Mudwort*, Section  
 14 13B.23, *Sanford's Arrowhead*, Section 13B.24, *Marsh Skullcap*, Section 13B.25, *Side-Flowering*  
 15 *Skullcap*, and Section 13B.27, *Suisun Marsh Aster*.

### 16 **All Project Alternatives**

#### 17 Construction

18 All project alternatives would potentially have impacts on occurrences of special-status tidal  
 19 freshwater emergent plants. The number of occurrences and potential for affecting undocumented  
 20 occurrences in areas of modeled habitat varies by species and by alternative (Table 13-37 through  
 21 Table 13-46). Locations where the project footprint crosses modeled habitat identify where the  
 22 highest potential for impacts on undocumented occurrences of these species could occur.

23 **Table 13-37. Impacts on Bolander's Water-Hemlock by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1	548	0.19	5	0
2a, 2b, 2c	548	0.18	5	0
3, 4a, 4b, 4c	548	0.15	5	0
5	548	0.09	5	0

24  
 25 **Table 13-38. Impacts on Bristly Sedge by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1	1,345	3.11	18	2
2b	1,345	1.82	18	1
2c	1,345	2.76	18	2
3, 4a	1,345	2.59	18	2
4b	1,345	1.40	18	1
4c	1,345	2.34	18	2

1 **Table 13-39. Impacts on Delta Mudwort by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1	2,238	6.41	58	0
2a	2,238	7.78	58	0
2b	2,238	5.80	58	0
2c	2,238	6.27	58	0
3	2,238	4.17	58	0
4a	2,238	5.60	58	0
4b	2,238	3.62	58	0
4c	2,238	4.09	58	0
5	2,238	1.49	58	0

2

3 **Table 13-40. Impacts on Delta Tule Pea by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1	5,300	39.20	62	4
2a	5,300	40.71	62	4
2b	5,300	36.28	62	4
2c	5,300	38.87	62	4
3	5,300	8.41	62	1
4a	5,300	9.98	62	1
4b	5,300	5.53	62	1
4c	5,300	8.14	62	1
5	5,300	8.62	62	1

4

5 **Table 13-41. Impacts on Marsh Skullcap by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2c	795	0.37	5	0
2a, 2b	795	0.33	5	0
3, 4a, 4b	795	0.16	5	0
4c	795	0.20	5	0
5	795	0.14	5	0

6

7 **Table 13-42. Impacts on Mason's Lilaopsis by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1	2,231	6.41	158	1
2a	2,231	7.78	158	1

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
2b	2,231	5.80	158	1
2c	2,231	6.27	158	1
3	2,231	4.17	158	0
4a	2,231	5.60	158	0
4b	2,231	3.62	158	0
4c	2,231	4.09	158	0
5	2,231	1.49	158	0

1

2

**Table 13-43. Impacts on Sanford's Arrowhead by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1	1,915	0.93	23	0
2a, 2b, 2c	1,915	0.78	23	0
3, 4a, 4b, 4c	1,915	0.18	23	0
5	1,915	0.33	23	0

3

4

**Table 13-44. Impacts on Side-Flowering Skullcap by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1, 2c	1,111	0.37	13	1
2a, 2b	1,111	0.33	13	1
3, 4a, 4b	1,111	0.16	13	0
4c	1,111	0.20	13	0
5	1,111	0.14	13	0

5

6

**Table 13-45. Impacts on Suisun Marsh Aster by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1	5,520	34.08	125	12
2a	5,520	35.33	125	12
2b	5,520	31.77	125	12
2c	5,520	33.60	125	12
3	5,520	5.36	125	1
4a	5,520	6.69	125	1
4b	5,520	3.14	125	1
4c	5,520	4.97	125	1
5	5,520	4.83	125	1

7

1 **Table 13-46. Impacts on Woolly Rose-Mallow by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1	700	0.10	119	0
2a, 2b, 2c	700	0.09	119	0
3, 4a, 4b, 4c	700	0.13	119	0
5	700	0.06	119	0

2

3 No project alternatives would affect known occurrences of Bolander's water-hemlock. All project  
4 alternatives would intersect modeled habitat for Bolander's water-hemlock. Alternatives 1, 2a, 2b  
5 and 2c intersects the most modeled habitat for Bolander's water-hemlock, and Alternative 5  
6 intersects the least modeled habitat.

7 All project alternatives would affect known occurrences of bristly sedge. Alternatives 1, 2a, 2c, 3, 4a,  
8 4c, and 5 would affect two known occurrences, and Alternatives 2b and 4b would affect one known  
9 occurrence. All project alternatives intersect modeled habitat for bristly sedge. Alternatives 1 and 2a  
10 intersect the most modeled habitat for bristly sedge, and Alternative 4b intersects the least modeled  
11 habitat.

12 No project alternatives would affect known occurrences of Delta mudwort. All project alternatives  
13 intersect modeled habitat for Delta mudwort. Alternative 2a intersects the most modeled habitat for  
14 Delta mudwort, and Alternative 5 intersects the least modeled habitat.

15 All project alternatives would affect known occurrences of Delta tule pea and intersect modeled  
16 habitat for Delta tule pea. The central alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would  
17 affect four occurrences and intersect modeled habitat. The eastern and Bethany Reservoir alignment  
18 alternatives (Alternatives 3, 4a, 4b, 4c, and 5) would affect one occurrence and intersect modeled  
19 habitat.

20 No project alternatives would affect known occurrences of Marsh skullcap. All alternatives intercept  
21 modeled habitat for Marsh skullcap. Alternatives 1 and 2c intercepts the most modeled habitat for  
22 Marsh skullcap, and Alternative 5 intercepts the least modeled habitat.

23 The central alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would affect one known  
24 occurrences of Mason's lilaeopsis and intercept more modeled habitat for Mason's lilaeopsis than  
25 the eastern and Bethany Reservoir alignment alternatives (Alternatives 3, 4a, 4b, 4c, and 5). The  
26 eastern and Bethany Reservoir alignment alternatives would not affect known Mason's lilaeopsis  
27 occurrences and would intercept fewer acres of modeled habitat.

28 No project alternatives would affect known occurrences of Sanford's arrowhead. The central  
29 alignment alternatives (Alternatives 1, 2a, 2b, and 2c) intercept more modeled habitat for Sanford's  
30 arrowhead than the eastern and Bethany Reservoir alignment alternatives (Alternatives 3, 4a, 4b,  
31 4c, and 5).

32 The central alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would affect one known side-  
33 flowering skullcap occurrence and intercept more modeled habitat (0.33 to 0.37 acre) than the  
34 eastern and Bethany Reservoir alignment alternatives (Alternatives 3, 4a, 4b, 4c, and 5). The eastern  
35 and Bethany Reservoir alignment alternatives would affect no occurrences and intercept modeled  
36 habitat.

1 The central alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would affect 12 known Suisun  
2 Marsh aster occurrences and intersect modeled habitat for Suisun Marsh aster. The eastern and  
3 Bethany Reservoir alignment alternatives (Alternatives 3, 4a, 4b, 4c, and 5) would have much lower  
4 impacts, affecting only one occurrence of Suisun Marsh aster and intersecting modeled habitat.

5 No project alternatives would affect known occurrences of woolly rose-mallow. All project  
6 alternatives intersect modeled habitat for woolly rose-mallow.

7 Field investigations would be conducted prior to and during construction under all project  
8 alternatives to more specifically identify appropriate construction methods and design criteria  
9 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
10 existing utilities, and address the establishment of geological and groundwater monitoring  
11 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
12 would involve a variety of ground-disturbing activities that would vary in duration from several  
13 hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
14 Construction Authority 2022a, 2022b) and would involve some in-water boring that could affect  
15 special-status tidal freshwater emergent wetland plants (Section 3.15, *Field Investigations*).  
16 Geotechnical investigations associated with the tunnels for all project alternatives, which include  
17 CPTs and soil borings, would result in impacts on modeled habitat for special-status tidal freshwater  
18 emergent plants (Appendix 13C). Geotechnical investigations associated with the West Tracy Fault,  
19 pilot studies for settlement, agronomic testing, and utility potholing would not occur in modeled  
20 habitat for special-status tidal freshwater emergent plants. The following field investigations would  
21 be conducted within proposed surface construction footprints of project facilities (including  
22 portions of tunnel alignments) and would temporarily affect modeled habitat for special-status tidal  
23 freshwater emergent plants: test trenches, CPTs, soil borings, ERT, groundwater testing and  
24 monitoring, and monument installation. Environmental Commitments EC-1: *Conduct Worker*  
25 *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
26 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
27 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these  
28 potential impacts by training construction staff on protecting sensitive biological resources,  
29 reporting requirements, and the ramifications for not following these measures; by implementing  
30 spill prevention and containment plans that would avoid material spills that could affect the viability  
31 of aquatic habitat; and by having a biological monitor present to ensure that all other protective  
32 measures are being implemented where applicable.

### 33 Operations

34 As discussed in Chapter 5, *Surface Water*, project operations would not substantially alter river  
35 flows on the Sacramento and San Joaquin Rivers. Therefore, project operations would not  
36 substantially affect tidal freshwater emergent habitat for special-status plants.

### 37 Maintenance

38 Project maintenance of water conveyance facilities for all project alternatives could result in impacts  
39 on special-status tidal freshwater emergent wetland plants. Maintenance activities across all  
40 facilities that could affect this community include repaving of access roads every 15 years and  
41 semiannual general and ground maintenance. These activities also create the potential for runoff of  
42 paving material or materials from parked vehicles or staging areas.



## 1 **CEQA Conclusion—All Project Alternatives**

2 Project features cross occurrences of bristly sedge, Delta tule pea, Mason's lilaepsis, side-flowering  
3 skullcap, Suisun Marsh aster and cross modeled habitat for all 10 special-status tidal wetland plants.  
4 Alternatives could cause a net loss of individual plants (take) or habitat loss within occurrences of  
5 special-status plants if the species are present. Impacts on known occurrences and potential impacts  
6 on unknown occurrences where habitat is modeled vary among species and alternatives. Because  
7 these species are seriously to moderately threatened in California, these impacts would represent a  
8 substantial loss and would be significant.

9 Temporary disturbances and indirect impacts on special-status tidal freshwater emergent wetland  
10 plants would be reduced by Environmental Commitment EC-14: *Construction Best Management*  
11 *Practices for Biological*. Even with this environmental commitment, however, the loss of tidal  
12 freshwater emergent plants from construction and potential impacts from maintenance activities  
13 would be significant. Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status*  
14 *Natural Communities and Special-Status Plants* would reduce impacts on special-status tidal  
15 freshwater emergent wetland species during project construction. Mitigation Measure BIO-2b: *Avoid*  
16 *and Minimize Impacts on Terrestrial Biological Resources from Maintenance Activities* would reduce  
17 impacts on tidal freshwater emergent wetland during project maintenance. Under Mitigation  
18 Measure CMP: *Compensatory Mitigation Plan* (Appendix 3F, Section 3F.3.2.5 and Attachment 3F.1,  
19 Table 3F.1-2, CMP-2: *Tidal Freshwater Emergent Wetland*, and Table 3F.1-3, CMP-9: *Special-Status*  
20 *Plants*), habitat for special-status tidal freshwater emergent wetland plants would be created or  
21 acquired and permanently protected to compensate for project impacts and ensure no significant  
22 loss of special-status tidal perennial aquatic wetland habitat functions and values. Therefore, project  
23 impacts on special-status tidal freshwater emergent wetland plants would be less than significant  
24 with mitigation.

### 25 **Mitigation Measure BIO-2a: Avoid or Minimize Impacts on Special-Status Natural** 26 **Communities and Special-Status Plants**

27 See description of Mitigation Measure BIO-2a under Impact BIO-2.

### 28 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 29 **Resources from Maintenance Activities**

30 See description of Mitigation Measure BIO-2a under Impact BIO-2.

### 31 **Mitigation Measure CMP: Compensatory Mitigation Plan**

32 Under the CMP (see Impact BIO-1 for a summary discussion of the CMP), DWR would ensure  
33 that tidal freshwater emergent wetland habitat would be created or acquired and permanently  
34 protected to compensate for project impacts and ensure no significant loss of tidal freshwater  
35 emergent wetlands and implement the design commitments and guidelines for restoring  
36 suitable habitat for special-status plants (Appendix 3F, Section 3F.3.2.5 and Attachment 3F.1,  
37 Table 3F.1-2, CMP-2: *Tidal Freshwater Emergent Wetland*, and Table 3F.1-3, CMP-9: *Special-*  
38 *Status Plants*).

## 1 ***Mitigation Impacts***

2 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
3 mitigation measure impacts. The analyses below consider the potential impacts associated with  
4 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
5 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
6 *Measures*.

### 7 *Compensatory Mitigation*

8 Compensatory mitigation on Bouldin Island and at the I-5 ponds would not affect any known  
9 occurrences of special-status tidal freshwater emergent wetland plants. However, the construction  
10 footprint of the compensatory habitat intersects modeled habitat for three species: bristly sedge,  
11 Delta tule pea, and Sanford's arrowhead. Therefore, the CMP could potentially have impacts on these  
12 three species. In addition, implementation of the CMP could result in other impacts on special-status  
13 tidal freshwater emergent plants because other identified areas for tidal wetland habitat restoration  
14 and channel margin enhancement include the Cache Slough Complex and Yolo Bypass (Appendix 3F,  
15 Section 3F.4.3.4.2, *Site Selection Criteria and Tools*), which are adjacent to modeled habitat for  
16 special-status tidal freshwater emergent wetland plants and several records of the species that  
17 occur in these general areas. Grading and fill to support these activities could directly affect habitat  
18 supporting these species.

19 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
20 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would not likely result effects on tidal  
21 freshwater emergent wetland plants because they would not likely occur within or adjacent to this  
22 community. Site-specific analyses are not provided because locations of potential non-bank sites are  
23 not currently known.

24 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
25 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
26 management of agricultural areas but may also include natural communities in the study area  
27 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
28 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
29 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
30 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These activities would not likely result in effects  
31 on tidal freshwater emergent wetland plants because management activities in these areas would be  
32 limited in scope and would not likely involve physical changes to habitats where these species are  
33 typically found. Site-specific analyses are not provided because locations of potential protection  
34 instruments are not currently known.

35 The CMP and site-specific permitting approvals would ensure that there is no significant loss in  
36 habitat or habitat value by adjusting the overall mitigation commitment (Appendix 3F, Section  
37 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General Design Guidelines*) and  
38 therefore reduce any habitat losses associated with the CMP to less than significant. Mitigation  
39 Measure CMP: *Compensatory Mitigation Plan* would offset permanent and temporary loss of tidal  
40 freshwater emergent wetland. Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-*  
41 *Status Natural Communities and Special-Status Plants*, during implementation of the CMP, would  
42 reduce impacts on special-status tidal freshwater emergent wetland plants.

1 The impacts on special-status tidal freshwater emergent wetland plants from the project  
2 alternatives with the CMP would be less than significant with mitigation.

3 Other Mitigation Measures

4 Some mitigation measures would have impacts on tidal freshwater emergent wetland plants similar  
5 to those described under Impact BIO-1: *Impacts of the Project on the Tidal Perennial Aquatic Natural*  
6 *Community*. The impacts of habitat loss, ground disturbance, and exposure to hazardous materials  
7 on tidal freshwater emergent wetland plants would be reduced through the CMP, environmental  
8 commitments, and mitigation measures as detailed under Impact BIO-1: *Impacts of the Project on the*  
9 *Tidal Perennial Aquatic Natural Community*. Therefore, impacts on tidal freshwater emergent  
10 wetland plants from implementation of other mitigation measures would be reduced to less than  
11 significant.

12 Overall, the impacts on tidal freshwater emergent wetland plants from construction of  
13 compensatory mitigation and implementation of other mitigation measures, combined with project  
14 alternatives, would still be less than significant with mitigation.

15 **Impact BIO-13: Impacts of the Project on Special-Status Nontidal Perennial Aquatic Plants**

16 Information on the special-status nontidal perennial aquatic plants' life history and habitat  
17 suitability models are presented in the following species accounts in Appendix 13B: Section 13B.3,  
18 *Watershield*, and Section 13B.21, *Eel-Grass Pondweed*.

19 **All Project Alternatives**

20 Construction

21 The central alignment alternatives (Alternatives 1, 2a, 2b, and 2c) intersect one known watershed  
22 occurrence at Bouldin Island. Although the occurrence is reported to be extirpated and the  
23 likelihood of affecting the species is low, potential habitat is still present, and constructing shaft  
24 facilities and RTM areas could affect the species. The eastern and Bethany Reservoir alignment  
25 alternatives (Alternatives 3, 4a, 4b, 4c, and 5) would not affect known watershed occurrences, and  
26 no project alternatives would affect known eel-grass pondweed occurrences.

27 The potential for affecting undocumented occurrences in areas of modeled habitat varies by species  
28 and by alternative (Table 13-47 and Table 13-48). The central alignment alternatives (Alternatives  
29 1, 2a, 2b, and 2c) would intercept more modeled habitat for watershed than the eastern and  
30 Bethany Reservoir alignment alternatives (Alternatives 3, 4a, 4b, 4c, and 5). The central alignment  
31 alternatives would also intercept more modeled habitat for eel-grass pondweed than the eastern  
32 and Bethany Reservoir alignment alternatives (Alternatives 3, 4a, 4b, 4c, and 5). Project features  
33 crossing modeled habitat for nontidal wetland plants include the levee and access road  
34 improvements, power transmission lines, and geotechnical investigations. Constructing these  
35 facilities could potentially affect plants and occupied habitat of both nontidal wetland plant species.

36 **Table 13-47. Impacts on Watershield by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1	8,153	7.73	2	1

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
2a	8,153	8.12	2	1
2b	8,153	7.44	2	1
2c	8,153	7.63	2	1
3	8,153	3.43	2	0
4a	8,153	3.81	2	0
4b	8,153	3.14	2	0
4c	8,153	3.33	2	0
5	8,153	3.01	2	0

1

2

**Table 13-48. Impacts on Modeled Habitat for Eel-Grass Pondweed by Alternative**

Alternative	Modeled Habitat in Study Area (acres)	Modeled Habitat in Project Footprint (acres)	Occurrences in Study Area	Occurrences Affected
1	15,081	10.69	1	0
2a	15,081	11.01	1	0
2b	15,081	9.83	1	0
2c	15,081	10.54	1	0
3	15,081	1.73	1	0
4a	15,081	2.12	1	0
4b	15,081	0.93	1	0
4c	15,081	1.63	1	0
5	15,081	2.42	1	0

3

4 Field investigations would be conducted prior to and during construction under all project  
5 alternatives to more specifically identify appropriate construction methods and design criteria  
6 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
7 existing utilities, and address the establishment of geological and groundwater monitoring  
8 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
9 would involve a variety of ground-disturbing activities that would vary in duration from several  
10 hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
11 Construction Authority 2022a, 2022b), and could result in impacts on special-status nontidal  
12 wetland plants. Geotechnical investigations associated with tunnels for all alternatives, which  
13 include CPTs and soil borings, would result in temporary impacts on modeled habitat for special-  
14 status nontidal perennial aquatic plants (Appendix 13C). The West Tracy Fault Study and the  
15 Bethany Fault Study investigations, pilot studies for settlement, agronomic testing, and utility  
16 potholing would not affect modeled habitat for these species. The following field investigations  
17 would be conducted within proposed surface construction footprints of project facilities (including  
18 portions of tunnel alignments) and would temporarily affect habitat: test trenches, CPTs, soil  
19 borings, electrical resistivity tomography, groundwater testing and monitoring and monument  
20 installation. These temporary impacts are not characterized as an additional loss of habitat because  
21 impacts for these locations have already been quantified within the construction footprint.  
22 Environmental Commitments EC-1: *Conduct Worker Awareness Training* and EC-14: *Construction*  
23 *Best Management Practices for Biological Resources* (Appendix 3B) would reduce these potential

1 impacts by training construction staff on protecting sensitive biological resources, reporting  
2 requirements, and the ramifications for not following these measures and by having a biological  
3 monitor present to ensure that non-disturbance buffers and associated construction fencing are  
4 intact and all other protective measures are being implemented where applicable.

#### 5 Operations

6 Project operations would not occur in nontidal perennial aquatic habitat and would have no effects  
7 on special-status nontidal perennial aquatic plants.

#### 8 Maintenance

9 Project maintenance of water conveyance facilities for all project alternatives could result in impacts  
10 on special-status nontidal perennial aquatic plants. Maintenance activities across all facilities that  
11 could affect this community include repaving of access roads every 15 years and semiannual general  
12 and ground maintenance. These activities also create the potential for runoff of paving material or  
13 materials from parked vehicles or staging areas.

#### 14 **CEQA Conclusion—All Project Alternatives**

15 The project alternatives could remove occupied habitat for watershield. Watershield is not very  
16 threatened in California, but the Great Valley occurrences are particularly sensitive because they are  
17 regionally rare and are peripheral to the species' range. The project alternatives could also impact  
18 habitat for both watershield and eel-grass pondweed. Because this impact would cause a net loss of  
19 individual plants (take) or habitat loss within an occurrence of a special-status plant, it would be a  
20 significant impact.

21 Temporary disturbances and indirect impacts of nontidal perennial aquatic habitat would be  
22 reduced by Environmental Commitment EC-14: *Construction Best Management Practices for*  
23 *Biological Resources*. Even with this environmental commitment, however, the loss nontidal  
24 perennial aquatic plants from construction and potential impacts from maintenance activities would  
25 be significant. Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status Natural*  
26 *Communities and Special-Status Plants* would reduce impacts on special-status nontidal perennial  
27 aquatic plants during project construction. Mitigation Measure BIO-2b: *Avoid and Minimize Impacts*  
28 *on Terrestrial Biological Resources from Maintenance Activities* would reduce impacts on special-  
29 status nontidal perennial aquatic plants during project maintenance. Under Mitigation Measure  
30 CMP: *Compensatory Mitigation Plan*, habitat for special-status nontidal perennial aquatic plants  
31 would be created or acquired and permanently protected to compensate for project impacts and  
32 ensure no significant loss of special-status nontidal perennial aquatic plants or their habitat  
33 functions and values.

34 The project impacts on these special-status nontidal perennial aquatic plants would be less than  
35 significant with mitigation.

#### 36 **Mitigation Measure BIO-2a: Avoid or Minimize Impacts on Special-Status Natural** 37 **Communities and Special-Status Plants**

38 See description of Mitigation Measure BIO-2a under Impact BIO-2.

1           **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
2           **Resources from Maintenance Activities**

3           See description of Mitigation Measure BIO-2a under Impact BIO-2.

4           **Mitigation Measure CMP: Compensatory Mitigation Plan**

5           Under the CMP (see Impact BIO-1 for a summary discussion of the CMP), DWR would create and  
6           preserve nontidal freshwater perennial emergent wetland and nontidal perennial aquatic  
7           habitat and manage these areas in perpetuity and implement the design commitments and  
8           guidelines for restoring suitable habitat for special-status plants (Appendix 3F, Section 3F.3.2.3  
9           and Attachment 3F.1, Table 3F.1-2, CMP-4: *Nontidal Perennial Aquatic Habitat*, and CMP-5:  
10          *Nontidal Freshwater Perennial Emergent Wetland*, and Table 3F.1-3, CMP-9: *Special-Status*  
11          *Plants*).

12          ***Mitigation Impacts***

13          As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
14          mitigation measure impacts. The analyses below consider the potential impacts associated with  
15          implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
16          Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
17          *Measures*.

18          *Compensatory Mitigation*

19          The CMP (Appendix 3F) proposes habitat creation and restoration activities on Bouldin Island that  
20          could affect a known watershield occurrence. These activities could adversely affect watershield if  
21          the population is still extant and plants are present in the work areas. The CMP footprints on  
22          Bouldin Island and at the I-5 ponds intersects modeled habitat for watershield and eel-grass  
23          pondweed, which means that both species could potentially be affected by the CMP. In addition,  
24          implementation of the CMP could result in impacts on special-status nontidal freshwater perennial  
25          aquatic plants through tidal wetland habitat restoration and channel margin enhancement because  
26          potential areas identified include the Cache Slough Complex and Yolo Bypass (Appendix 3F, Section  
27          3F.4.3.4.2, *Site Selection Criteria and Tools*), which are adjacent to modeled habitat for special-status  
28          nontidal freshwater perennial aquatic plants and several records of the species that occur in these  
29          general areas. Grading and fill to support these activities could directly affect habitat or result in  
30          changes to topography and soils such that the hydrology of nontidal freshwater perennial aquatic  
31          wetlands supporting these species is altered.

32          In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
33          enhancement (Appendix 3F, Section 3F.3.2.4), these activities would not result in effects on the  
34          nontidal perennial aquatic community because they would not likely occur within or adjacent to this  
35          community. Site-specific analyses are not provided because locations of potential non-bank sites are  
36          not currently known.

37          Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
38          crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
39          management of agricultural areas but may also include natural communities in the study area  
40          (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
41          *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,

1 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
2 CMP-22b: *Tricolored Blackbird Foraging Habitat*). Except for croplands, some areas could potentially  
3 contain the nontidal perennial aquatic community but management activities in these areas would  
4 be limited in scope and would not likely involve physical changes to this community. Site-specific  
5 analyses are not provided because locations of potential protection instruments are not currently  
6 known.

7 The CMP and site-specific permitting approvals would ensure that there is no significant loss in  
8 habitat or habitat value by adjusting the overall mitigation commitment (Appendix 3F, Section  
9 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General Design Guidelines*) and  
10 therefore reduce any habitat losses associated with the CMP to less than significant.

11 Temporary disturbances and indirect impacts of nontidal perennial aquatic habitat would be  
12 reduced by Environmental Commitment EC-14: *Construction Best Management Practices for*  
13 *Biological Resources*. Mitigation Measure BIO-2a: *Avoid or Minimize Impacts on Special-Status*  
14 *Natural Communities and Special-Status Plants* and Mitigation Measure BIO-2b: *Avoid and Minimize*  
15 *Impacts on Terrestrial Biological Resources from Maintenance Activities* would reduce impacts on  
16 special-status nontidal perennial aquatic plants to less than significant when the CMP is  
17 implemented.

18 The impacts on special-status nontidal perennial aquatic plants from the project alternatives with  
19 the CMP would be less than significant with mitigation.

#### 20 *Other Mitigation Measures*

21 Some mitigation measures would have impacts on nontidal freshwater perennial aquatic plants  
22 similar to those described under Impact BIO-1: *Impacts of the Project on the Tidal Perennial Aquatic*  
23 *Natural Community*. The impacts of habitat loss, ground disturbance, and exposure to hazardous  
24 materials on nontidal freshwater perennial aquatic plants would be reduced through the CMP,  
25 environmental commitments, and mitigation measures as detailed under Impact BIO-1: *Impacts of*  
26 *the Project on the Tidal Perennial Aquatic Natural Community*. Therefore, impacts on nontidal  
27 freshwater perennial aquatic plants from implementation of other mitigation measures would be  
28 reduced to less than significant.

29 Overall, the impacts on nontidal freshwater perennial aquatic plants from construction of  
30 compensatory mitigation and implementation of other mitigation measures, combined with project  
31 alternatives, would still be less than significant with mitigation.

### 13.3.3.4 Impacts of the Project Alternatives on Special-Status Wildlife Species

#### Impact BIO-14: Impacts of the Project on Vernal Pool Aquatic Invertebrates

The impact analysis for vernal pool aquatic invertebrates covers multiple species that occur in vernal pools and other seasonal wetlands, which includes the federally listed vernal pool fairy shrimp and vernal pool tadpole shrimp, as well as the nonlisted midvalley fairy shrimp, California linderiella, hairy water flea, and Ricksecker's water scavenger beetle. The methods for the analysis of effects on these species appear in Section 13.3.1.1, *Impact Mechanisms*, and information on the species life histories and habitat suitability models are presented in the following species accounts in Appendix 13B, *Species Accounts*: Section 13B-32, *Vernal Pool Fairy Shrimp*, Section 13B-33, *Midvalley Fairy Shrimp*, Section 13B-34, *California Linderiella*, Section 13B-35, *Vernal Pool Tadpole Shrimp*, Section 13B-36, *Hairy Water Flea*, and Section 13B-41, *Ricksecker's Water Scavenger Beetle*.

#### All Project Alternatives

##### Construction

The construction of Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c would result in permanent, temporary, and indirect effects on modeled habitat for vernal pool aquatic invertebrates. Construction-related grading and excavation would result in the permanent and temporary loss of vernal pool aquatic invertebrate modeled habitat (Table 13-49). These impacts would occur as a result of the construction of new roads and a temporary railroad spur near Clifton Court Forebay (permanent, temporary, and indirect), the construction of the new South Delta Outlet and Control Structure on the California Aqueduct approach channel (indirect), construction of a new transmission line around Clifton Court Forebay (permanent, temporary, and indirect) and the construction of the park-and-ride facility off Hood-Franklin Road, east of I-5 (indirect). The park-and-ride lot would be removed following construction. Environmental Commitment EC-14: *Construction Best Management Practices for Biological Resources* would ensure that temporarily disturbed areas are restored (Appendix 3B). Construction-related grading and excavation could result in indirect effects on aquatic habitat within 250 feet of this disturbance. USFWS typically considers construction within 250 feet of vernal pool habitat to constitute a possible impact on the habitat unless more detailed information is provided to further refine the limits of any such effects. For the purposes of this analysis, the 250-foot buffer was applied to the project work areas where ground-disturbing activities would take place. Activities such as grading and excavation have the potential to change the supporting surface and subsurface hydrology such that aquatic habitat potentially becomes drier over time and does not provide suitable hydrology to support the life cycles of these species.

**Table 13-49. Impacts on Modeled Habitat for Vernal Pool Aquatic Invertebrates by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Indirect Impacts (acres)	Total (acres)
1, 2b, 2c, 3, 4b, 4c	3.26	3.67	72.53	79.46
2a, 4a	3.26	3.67	75.88	82.81
5	0.42	0.76	11.55	12.73

<sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see discussion in Section 13.3.1.2.



1 Alternative 5 would also have impacts on vernal pool aquatic invertebrates in a similar fashion as  
 2 described for the other alternatives but would result from construction of the Bethany Reservoir  
 3 Aqueduct (permanent, temporary, and indirect), road improvements along Mountain House Road,  
 4 and the construction of the park-and-ride facility off Hood-Franklin Road, east of I-5 (indirect)  
 5 (Table 13-49).

6 Construction activities associated with all project alternatives could result in the injury or mortality  
 7 of vernal pool aquatic invertebrates as a result of the inadvertent discharge of construction-related  
 8 fluids or sediment into aquatic habitat that occurs adjacent to work areas, typically within 250 feet.  
 9 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
 10 *Implement Hazardous Materials Management Plans*, EC-3: *Develop and Implement Spill Prevention,*  
 11 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
 12 *Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training  
 13 construction staff on the needs of protecting aquatic habitat for sensitive species, reporting  
 14 requirements, and the ramifications for not following these measures; (2) implementing spill  
 15 prevention and containment plans that would avoid material spills that could affect species and  
 16 aquatic habitat; and (3) having a biological monitor present to ensure that non-disturbance buffers  
 17 and associated construction fencing are intact and all other protective measures are being  
 18 implemented, where applicable.

19 No CNDDDB occurrences of vernal pool fairy shrimp, vernal pool tadpole shrimp, midvalley fairy  
 20 shrimp, hairy water flea, and Ricksecker's water scavenger beetle would be permanently,  
 21 temporarily, or indirectly affected by project construction for any of the alternatives (California  
 22 Department of Fish and Wildlife 2020a). There is one occurrence of California linderiella (CNDDDB  
 23 occurrence #388) that overlaps with the road improvements off Hood-Franklin Road just west of  
 24 Stone Lakes; however, the mapped location displayed in the CNDDDB GIS data, despite having an  
 25 accuracy defined as being a "specific area," is large and encompasses both the road and other areas  
 26 of non-habitat (California Department of Fish and Wildlife 2020a). The record describes the species  
 27 occurring in several pools just south of North Stone Lake (California Department of Fish and Wildlife  
 28 2020a). There is no modeled habitat at the portion of the occurrence polygon that overlaps with the  
 29 road improvement area.

30 All project alternatives would result in permanent, temporary, and indirect impacts on modeled  
 31 habitat within critical habitat for vernal pool fairy shrimp (unit 19B) as a result of the construction  
 32 of new roads, a temporary work area, and a temporary railroad right-of-way between Clifton Court  
 33 Forebay and Byron Highway (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and the West Tracy Fault  
 34 work as part of field investigations (discussed below) under all alternatives (Table 13-50). This  
 35 critical habitat unit (unit 19B) is also identified as part of the Altamont Hills core area in the  
 36 *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (U.S. Fish and Wildlife  
 37 Service 2005:Figure III-6a). There are approximately 1,475 acres of critical habitat within the study  
 38 area, 4,925 areas of critical habitat in unit 19B, and 597,821 acres of critical habitat for vernal pool  
 39 fairy shrimp in total. No critical habitat for vernal pool tadpole shrimp would be affected by the  
 40 project alternatives.

41 **Table 13-50. Impacts on Modeled Habitat within Critical Habitat for Vernal Pool Fairy Shrimp by**  
 42 **Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1, 2a, 2b, 2c, 3, 4a, 4b, 4c	1.60	0.84	2.44

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
5	0.00	0.23	0.23

Note: Total modeled habitat in critical habitat in the study area is 338 acres, total impacts by alternative range between 0.07%–0.72% of this total.

<sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see discussion in Section 13.3.1.2.

Field investigations for all project alternatives would be conducted prior to and during construction to more specifically identify appropriate construction methods and design criteria addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities, and address the establishment of geological and groundwater monitoring programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a variety of ground-disturbing activities that would vary in duration from several hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and Construction Authority 2022a, 2022b) and could result in impacts on habitat and the potential for injury and mortality of vernal pool aquatic invertebrates. Geotechnical investigations that would occur in the West Tracy Fault Study area and over the tunnel alignment footprints, which include test trenches, CPTs, soil borings, and geophysical arrays, would result in temporary impacts on habitat (Appendix 13C, *Impact Tables*). Geotechnical investigations associated with the tunnels linking the Southern Forebay to the South Delta Outlet and Control Structure (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and the eastern alignment tunnel to the Bethany Complex and the tunnel to the Bethany Reservoir Discharge Structure (Alternative 5) would avoid impacts on vernal pool aquatic invertebrate habitat as specified in EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B), which commits to geotechnical investigations avoiding impacts on wetlands, except for the West Tracy Fault work, which has less flexibility on locations of work. The Bethany Fault Study investigations would not affect modeled vernal pool aquatic invertebrate habitat. The following field investigations would be conducted within proposed surface construction footprints of project facilities (including portions of tunnel alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT, groundwater testing and monitoring, monument installation, pilot studies for settlement, agronomic testing, and utility potholing. These temporary impacts are not characterized as an additional loss of habitat because impacts for these locations have already been quantified within the construction-related footprints. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*, EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would minimize these potential impacts by training construction staff on the needs of protecting aquatic habitat for sensitive species, reporting requirements, and the ramifications for not following these measures; by implementing spill prevention and containment plans that would avoid material spills that could affect species and aquatic habitat; and by having a biological monitor present to ensure that non-disturbance buffers and associated construction fencing are intact and all other protective measures are being implemented, where applicable.

### Operations

None of the project alternatives would result in operational impacts on vernal pool aquatic invertebrates or habitat because operating conveyance facilities would not involve disturbance or removal of habitat or effects on vernal pool species.

## 1 Maintenance

2 The maintenance of the Southern Complex on Byron Tract and west of Byron Highway (Alternatives  
3 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) could result in periodic, temporary impacts on vernal pool aquatic  
4 invertebrates. Maintenance at the Southern Forebay would include repaving of access roads every  
5 15 years, quarterly weed management (e.g., mechanical removal and herbicide application), and  
6 semiannual general and ground maintenance (e.g., mowing, vegetation trimming) could result in  
7 impairment to the water quality of vernal pool aquatic invertebrate habitat immediately adjacent to  
8 where these activities are taking place. Maintenance activities at the South Delta Outlet and Control  
9 Structure, which would include annual cleaning (pressure washing), semiannual general and ground  
10 maintenance (e.g., mowing, vegetation trimming, herbicide application), and daily or weekly  
11 inspections by vehicle, could result in the impairment of the water quality of vernal pool aquatic  
12 habitat occurring adjacent to where these activities are taking place. These impacts would occur if  
13 chemicals used during these activities reach aquatic habitat through spills or from storm runoff.  
14 There is modeled aquatic habitat within 50 feet of the facility.

15 No maintenance activities at the Bethany Complex (Alternative 5) are anticipated to result in  
16 impacts on vernal pool aquatic invertebrates because there are no aboveground facilities that occur  
17 within 250 feet of aquatic habitat. Although the Bethany Reservoir Aqueduct would affect a pool  
18 during construction and would be within 250 feet of the remaining portions of that pool, as well as  
19 another pool, this section of the aqueduct would be buried and maintenance would be limited to  
20 vegetation management around manways (i.e., access points to buried pipelines), which would be  
21 more than 500 feet from the nearest pool and would not likely result in direct or indirect effects on  
22 these pools.

## 23 **CEQA Conclusion—All Project Alternatives**

24 The construction of all project alternatives and the maintenance of Alternatives 1, 2a, 2b, 2c, 3, 4a,  
25 4b, and 4c would result in impacts on vernal pool aquatic invertebrates through the permanent and  
26 temporary loss of modeled habitat and the potential for injury and mortality of these species. The  
27 potential impacts of injury and mortality from project construction would be reduced by  
28 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
29 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
30 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
31 *Biological Resources* (Appendix 3B). Even with these environmental commitments, however, the loss  
32 of habitat from constructing project alternatives and the potential for injury, mortality, and  
33 disruption of normal behaviors from construction and maintenance activities on vernal pool aquatic  
34 invertebrates would be significant. Implementation of the CMP would be required to offset the loss  
35 of vernal pool aquatic invertebrate habitat, which would be achieved through the purchase of  
36 mitigation credits specifically for impacts on vernal pool fairy shrimp and vernal pool tadpole  
37 shrimp at a USFWS-approved mitigation bank (Appendix 3F, Section 3F.3.3.3, and Attachment 3F.1,  
38 Table 3F.1-3, CMP-11: *Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp Habitat*), which  
39 would also benefit the other vernal pool aquatic invertebrates analyzed and reduce the impact  
40 associated with habitat loss on vernal pool aquatic invertebrates to a less-than-significant level.  
41 Mitigation Measures BIO-2b: *Avoid and Minimize Impacts on Terrestrial Biological Resources from*  
42 *Maintenance* and BIO-14: *Avoid and Minimize Impacts on Vernal Pool Aquatic Invertebrates and*  
43 *Critical Habitat for Vernal Pool Fairy Shrimp* would be required to avoid and minimize the potential  
44 for injury and mortality and disturbances to habitat. The impacts on vernal pool aquatic  
45 invertebrates from the project alternatives would be less than significant with mitigation because

1 the measures would replace lost habitat and reduce direct effects on the species, including habitat  
2 disturbance, by avoiding and minimizing activities during construction and maintenance that could  
3 adversely affect habitat, which include establishing non-disturbance buffers around pools with  
4 construction fencing, by surveying suitable habitat for vernal pool fairy shrimp and vernal pool  
5 tadpole shrimp, and by avoiding adverse modification of critical habitat and indirect effects on  
6 vernal pool aquatic invertebrate habitat through work area redesigns, to the extent practicable.

### 7 **Mitigation Measure CMP: Compensatory Mitigation Plan**

8 DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to  
9 offset the loss of vernal pool aquatic invertebrate habitat by purchasing credits at a USFWS-  
10 approved mitigation bank or at a non-bank site approved by USFWS supporting habitat for  
11 vernal pool fairy shrimp and vernal pool tadpole shrimp (Appendix 3F, Section 3F.3.3.3 and  
12 Attachment 3F.1, Table 3F.1-3, CMP-11: *Vernal Pool Fairy Shrimp and Vernal Pool Tadpole*  
13 *Shrimp Habitat*). Mitigation at a non-bank location would be prioritized in the Altamont Hills  
14 recovery area, which is one of the core recovery areas identified in the Vernal Pool Recovery  
15 Plan (U.S. Fish and Wildlife Service 2005:III-38). This mitigation would also benefit the other  
16 vernal pool aquatic invertebrates analyzed in the EIR.

### 17 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 18 **Resources from Maintenance Activities**

19 See description of Mitigation Measure BIO-2b under Impact BIO-2.

### 20 **Mitigation Measure BIO-14: Avoid and Minimize Impacts from Construction on Vernal** 21 **Pool Aquatic Invertebrates and Critical Habitat for Vernal Pool Fairy Shrimp**

#### 22 ***All Project Alternatives***

23 As properties become accessible for initiating project activities, planning level surveys will be  
24 conducted to assess the suitability of modeled habitat and, where suitable, conduct protocol-  
25 level surveys for vernal pool fairy shrimp and vernal pool tadpole shrimp. To the extent  
26 practicable, work areas will be designed to avoid habitat for vernal pool aquatic invertebrates  
27 and critical habitat for vernal pool fairy shrimp. Where practicable, the project will be planned  
28 and designed to avoid ground-disturbing activities or alterations to hydrology within 250 feet of  
29 vernal pool aquatic invertebrate habitat. Where activities need to occur within 250 feet of  
30 habitat, those work areas will be assessed for their potential to alter the hydrology of the pool  
31 habitat such that the hydroperiod of the pool will no longer support the species. Where the  
32 USFWS agrees that any changes to the hydroperiod will not permanently affect habitat  
33 functionality, compensatory mitigation would not be required.

34 To the extent practicable, DWR will minimize impacts on critical habitat for vernal pool fairy  
35 shrimp. To achieve this, project construction will occur at least 250 feet from vernal pool fairy  
36 shrimp critical habitat containing the primary constituent elements defined below unless it is  
37 determined through USFWS review that the activities within the buffer will not substantially  
38 modify the primary constituent elements of vernal pool fairy shrimp critical habitat.

39 Primary constituent elements for vernal pool fairy shrimp are defined as follows (70 FR 46924-  
40 46998).

- 1 1. Topographic features characterized by mounds and swales and depressions within a matrix  
2 of surrounding uplands that result in complexes of continuously, or intermittently, flowing  
3 surface water in the swales connecting the pools described below, providing for dispersal  
4 and promoting hydroperiods of adequate length in the pools.
- 5 2. Depressional features including isolated vernal pools with underlying restrictive soil layers  
6 that become inundated during winter rains and that continuously hold water for a minimum  
7 of 18 days, in all but the driest years, thereby providing adequate water for incubation,  
8 maturation, and reproduction. As these features are inundated on a seasonal basis, they do  
9 not promote the development of obligate wetland vegetation habitats typical of  
10 permanently flooded emergent wetlands.
- 11 3. Sources of food, expected to be detritus occurring in the pools, contributed by overland flow  
12 from the pools' watershed, or the results of biological processes within the pools  
13 themselves, such as single-celled bacteria, algae, and dead organic matter, to provide for  
14 feeding.
- 15 4. Structure within the pools described above, consisting of organic and inorganic materials,  
16 such as living and dead plants from plant species adapted to seasonally inundated  
17 environments, rocks, and other inorganic debris that may be washed, blown, or otherwise  
18 transported into the pools, that provide shelter.

19 For suitable aquatic habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp that will  
20 be affected by the project, protocol-level surveys for these species will be conducted to  
21 determine whether they are present or where time does not allow for surveys to be completed  
22 (e.g., dry years, timely access), the suitable habitat will be assumed to be occupied. Surveys will  
23 be conducted according to the most recent USFWS guidelines by USFWS-approved biologists  
24 with the appropriate recovery permit under Section 10(a)(1)(A) of the ESA.

25 Project elements will be designed to avoid direct and indirect effects on vernal pool aquatic  
26 invertebrate habitat to the extent practicable. Where construction occurs within 250 feet of  
27 vernal pool crustacean habitat, construction BMPs will be implemented to ensure that  
28 construction activities minimize effects on the habitat. Protective fencing will be installed  
29 around vernal pool aquatic invertebrate habitat with signage identifying these areas as  
30 containing sensitive biological resources. A biological monitor will ensure that fencing and BMPs  
31 are maintained for the duration of construction and that construction personnel are provided  
32 the necessary worker awareness training.

### 33 ***Mitigation Impacts***

34 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
35 mitigation measure impacts. The analyses below consider the potential impacts associated with  
36 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
37 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
38 *Measures*.

### 39 **Compensatory Mitigation**

40 Implementation of the CMP could result in impacts on vernal pool aquatic invertebrates through  
41 tidal wetland habitat restoration and channel margin enhancement because potential areas  
42 identified include the Cache Slough Complex and Yolo Bypass (Appendix 3F, Section 3F.4.3.4.2, *Site*

1 *Selection Criteria and Tools*), which are adjacent to modeled habitat for vernal pool aquatic  
2 invertebrates and several records of the species are in these general areas. Grading and fill to  
3 support these activities, including introducing areas to tidal hydrology, could directly affect habitat  
4 or result in changes to topography and soils such that the hydrology of vernal pools supporting  
5 these species is altered.

6 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
7 species under the project's CMP on Bouldin Island and the I-5 ponds would not result in effects on  
8 vernal pool aquatic invertebrates because there is no habitat for these species in these areas.

9 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
10 enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in the temporary  
11 disturbance of existing habitat and the potential for injury or mortality of vernal pool aquatic  
12 invertebrates but would ultimately provide benefits for these species. Site-specific analyses are not  
13 provided because locations of potential non-bank sites are not currently known.

14 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
15 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
16 management of agricultural areas but may also include natural communities in the study area  
17 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
18 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
19 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
20 CMP-22b: *Tricolored Blackbird Foraging Habitat*). Vernal pool complexes and alkaline seasonal  
21 wetlands would not be targeted for these specific site protection instruments so there would not  
22 likely be any effects on vernal pool aquatic invertebrates. Site-specific analyses are not provided  
23 because locations of potential protection instruments are not currently known.

24 The CMP and site-specific permitting approvals would account for any losses of vernal pool aquatic  
25 habitat from tidal wetland habitat restoration and channel margin enhancement by mitigating for  
26 any habitat losses (Appendix 3F, Section 3F.1, *Introduction*, Section 3F.2.4, and Attachment 3F.1,  
27 Table 3F.1-2, CMP-0: *General Design Guidelines*), and therefore reducing any habitat losses  
28 associated with the CMP to a less-than-significant level. The habitat creation activities would also  
29 have the potential to cause injury and mortality of vernal pool aquatic invertebrates. Environmental  
30 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
31 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
32 *Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
33 (Appendix 3B) would reduce the potential for injury and mortality to a less-than-significant level.  
34 These impacts would be less than significant because the aforementioned measures would (1) train  
35 construction staff on the needs of protecting vernal pools, reporting requirements, and the  
36 ramifications of not following these measures; (2) implement spill prevention and containment  
37 plans that would avoid material spills that could affect the viability of nearby pools; and (3) have a  
38 biological monitor present to ensure that non-disturbance buffers and associated construction  
39 fencing are intact and all other protective measures are being implemented, where applicable.

40 The impacts on vernal pool aquatic invertebrates from the project alternatives with the CMP would  
41 be less than significant with mitigation.

1 Other Mitigation Measures

2 Some mitigation measures would involve ground disturbance, the use of heavy equipment, or have  
 3 the potential for inadvertent discharge of construction-related fluids or sediment within 250 feet of  
 4 vernal pools that would have the potential to have direct and indirect impacts on modeled habitat or  
 5 result in injury or mortality of vernal pool aquatic invertebrates due to discharge of sediment and  
 6 hazardous materials. Construction-related grading and excavation could result in direct and indirect  
 7 impacts on vernal pool aquatic invertebrate modeled habitat and could result in the mortality of  
 8 individuals. Impacts on vernal pool aquatic invertebrates resulting from implementation of  
 9 mitigation measures would be similar to construction effects of the project alternatives in certain  
 10 construction areas and would contribute to vernal pool aquatic invertebrates impacts of the project  
 11 alternatives.

12 However, the impacts of habitat loss, ground disturbance, and exposure to sediment or hazardous  
 13 materials on vernal pool aquatic invertebrates would be reduced through the CMP; Environmental  
 14 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
 15 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
 16 *Countermeasure Plans*; EC-14: *Construction Best Management Practices for Biological Resources*, and  
 17 Mitigation Measure BIO-14: *Avoid and Minimize Impacts on Vernal Pool Aquatic Invertebrates and*  
 18 *Critical Habitat for Vernal Pool Fairy Shrimp*. Therefore, impacts on vernal pool aquatic invertebrates  
 19 from implementation of other mitigation measures would be reduced to less than significant.

20 Overall, the impacts on vernal pool aquatic invertebrates from construction of compensatory  
 21 mitigation and implementation of other mitigation measures, combined with project alternatives,  
 22 would not change the impact from less than significant with mitigation.

23 **Impact BIO-15: Impacts of the Project on Conservancy Fairy Shrimp**

24 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
 25 information on the species life history and habitat suitability model for Conservancy fairy shrimp  
 26 are presented in the species account in Appendix 13B, Section 13B.31, *Conservancy Fairy Shrimp*.

27 **All Project Alternatives**

28 Construction

29 The construction of the project alternatives (all alternatives) would not result in impacts on  
 30 Conservancy fairy shrimp (Table 13-51). The modeled habitat for Conservancy fairy shrimp  
 31 depicted in Figure 13B.31-1 is more than 6 miles from the nearest project infrastructure, which is  
 32 more than 8 miles from the nearest CNDDB occurrence (California Department of Fish and Wildlife  
 33 2020a).

34 **Table 13-51. Impacts on Modeled Habitat for Conservancy Fairy Shrimp by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
All Alternatives	0.00	0.00	0.00

35 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 36 discussion in Section 13.3.1.2.

1        Operations

2        The operations of all project alternatives would not result in impacts on Conservancy fairy shrimp  
3        because of the distance of modeled and known occupied habitat from the project infrastructure.

4        Maintenance

5        The maintenance of all project alternatives would not result in impacts on Conservancy fairy shrimp  
6        because of the distance of modeled and known occupied habitat from the project infrastructure.

7        **CEQA Conclusion—All Project Alternatives**

8        All project alternatives would result in no impact on Conservancy fairy shrimp because no modeled  
9        or known habitat for this species occurs in the vicinity of project construction, operations, or  
10       maintenance areas.

11       **Mitigation Impacts**

12       As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
13       mitigation measure impacts. The analyses below consider the potential impacts associated with  
14       implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
15       Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
16       *Measures*.

17       Compensatory Mitigation

18       Implementation of the CMP could result in impacts on Conservancy fairy shrimp through tidal  
19       wetland habitat restoration and channel margin enhancement because one of the potential areas  
20       identified is the Cache Slough Complex (Appendix 3F, Section 3F.4.3.4.2), which is adjacent to  
21       modeled Conservancy fairy shrimp habitat and several records of the species. Grading and fill to  
22       support tidal wetland restoration and channel margin enhancement could directly affect habitat or  
23       result in changes to topography and soils such that the hydrology of vernal pools supporting  
24       Conservancy fairy shrimp is altered.

25       The creation and enhancement of wetlands and other waters as well as habitat for special-status  
26       species under the project's CMP on Bouldin Island and the I-5 ponds would not result in effects on  
27       Conservancy fairy shrimp because there is no habitat for this species in these areas.

28       In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
29       enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in the temporary  
30       disturbance of existing habitat and the potential for injury or mortality of Conservancy fairy shrimp  
31       if these activities occur within the range of the species but could ultimately provide benefits for the  
32       species. Site-specific analyses are not provided because locations of potential non-bank sites are not  
33       currently known.

34       Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
35       crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
36       management of agricultural areas but may also include natural communities in the study area  
37       (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3 CMP-18a: *Sandhill Crane Roosting*  
38       *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
39       CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and



1 CMP-22b: *Tricolored Blackbird Foraging Habitat*). Vernal pool complexes would not be targeted for  
2 these specific site protection instruments so there would not likely be any effects on Conservancy  
3 fairy shrimp. Site-specific analyses are not provided because locations of potential site protection  
4 instruments are not currently known.

5 The CMP and site-specific permitting approvals would account for any losses of Conservancy fairy  
6 shrimp habitat from tidal restoration and channel margin enhancement by mitigating for any habitat  
7 losses (Appendix 3F, Section 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General*  
8 *Design Guidelines*), and therefore reducing any habitat losses associated with the CMP to a less-than-  
9 significant level. The habitat creation and enhancement activities would also have the potential to  
10 cause injury and mortality of Conservancy fairy shrimp. Environmental Commitments EC-1: *Conduct*  
11 *Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*;  
12 EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
13 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce the  
14 potential for injury and mortality to a less-than-significant level. These impacts would be less than  
15 significant because the aforementioned measures would (1) train construction staff on the needs of  
16 protecting Conservancy fairy shrimp habitat, reporting requirements, and the ramifications of not  
17 following these measures; (2) implement spill prevention and containment plans that would avoid  
18 material spills that could affect the viability of nearby pools; and (3) have a biological monitor  
19 present to ensure that non-disturbance buffers and associated construction fencing are intact and all  
20 other protective measures are being implemented, where applicable. The impact on Conservancy  
21 fairy shrimp from the project alternatives with the CMP would be less than significant with  
22 mitigation.

### 23 Other Mitigation Measures

24 Other mitigation measures proposed would not have impacts on Conservancy fairy shrimp because  
25 no modeled or known habitat for this species occurs in the vicinity of project construction areas; the  
26 modeled habitat for this species depicted in Figure 13B.31-1 is more than 6 miles from the nearest  
27 project infrastructure, which is more than 8 miles from the nearest CNDDDB occurrence (California  
28 Department of Fish and Wildlife 2020a).

29 Overall, the construction of compensatory mitigation and implementation of other mitigation  
30 measures, combined with project alternatives, would not change the no impact conclusion for the  
31 project alternatives and the compensatory mitigation conclusion of less than significant with  
32 mitigation.

### 33 **Impact BIO-16: Impacts of the Project on Vernal Pool Terrestrial Invertebrates**

34 The impact analysis for vernal pool terrestrial invertebrates covers two species, molestan blister  
35 beetle and vernal pool andrenid bee, both of which are associated with upland portions of vernal  
36 pool complexes and aquatic portions once dry and supporting flowering plants. The methods for the  
37 analysis of effects on special-status species appear in Section 13.3.1.1 and information on the species  
38 life history and habitat suitability models are presented in the following species accounts in  
39 Appendix 13B: Section 13B.43, *Molestan Blister Beetle*, and Section 13B.44, *Blennosperma Vernal*  
40 *Pool Andrenid Bee*.

## 1 **All Project Alternatives**

### 2 Construction

3 The construction of Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c would result in the permanent and  
 4 temporary loss of modeled habitat, including potential indirect effects on habitat for vernal pool  
 5 terrestrial invertebrates. These impacts would occur as a result of the construction of new roads and  
 6 a temporary railroad near Clifton Court Forebay (permanent, temporary, and indirect), the  
 7 construction of the South Delta Outlet and Control Structure (indirect), and the construction of the  
 8 park-and-ride facility off Hood-Franklin Road east of I-5 (indirect). The park-and-ride lot would be  
 9 removed following construction. The implementation of Environmental Commitments EC-14:  
 10 *Construction Best Management Practices for Biological Resources* would ensure that temporarily  
 11 disturbed areas are restored (Appendix 3B). Construction-related grading and excavation would  
 12 result in the permanent and temporary loss of vernal pool terrestrial invertebrate habitat (Table 13-  
 13 52) as well as indirect effects on habitat from ground disturbance within 250 feet of vernal pools.  
 14 USFWS typically considers construction within 250 feet of vernal pool aquatic habitat to constitute a  
 15 possible impact on the habitat unless more detailed information is provided to further refine the  
 16 limits of any such effects. For the purposes of this analysis, the 250-foot buffer USFWS utilizes for  
 17 determining indirect effects on vernal pool branchiopods was applied to the project work areas  
 18 where disturbance activities would take place. Although these species are not aquatic, they do  
 19 forage on the flowering plants associated with vernal pools and associated grasslands (vernal pool  
 20 andrenid bees forage exclusively on *Blennosperma* sp.; molestan blister beetles forage on plants  
 21 associated with both vernal pools and associated grasslands). Grading and excavation within the  
 22 buffer have potential to change the supporting surface and subsurface hydrology such that aquatic  
 23 habitat potentially becomes drier over time and does not provide suitable hydrology to support the  
 24 flowering plants that these species forage on.

25 **Table 13-52. Impacts on Modeled Habitat for Vernal Pool Terrestrial Invertebrates by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Indirect Impacts (acres) <sup>b</sup>	Total (acres)
1, 2c, 3, 4c	9.02	10.13	8.53	27.68
2a, 4a	9.02	10.13	11.87	31.02
2b, 4b	8.95	9.88	8.53	27.36
5	23.53	2.54	9.60	35.67

26 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 27 discussion in Section 13.3.1.2.

28 <sup>b</sup> Indirect impacts only include vernal pools.

29 The construction of Alternative 5 would also result in the permanent and temporary loss of vernal  
 30 pool terrestrial invertebrate habitat, including indirect effects on habitat as a result of grading and  
 31 excavation. These impacts would occur as a result of a temporary access road to the Bethany  
 32 Reservoir Aqueduct off Kelso Road (indirect impacts), construction of the Bethany Reservoir  
 33 Aqueduct (temporary and permanent impacts), and the construction of the park-and-ride facility off  
 34 Hood-Franklin Road east of I-5 (indirect), similar to the discussion above. The construction of the  
 35 Bethany Reservoir Aqueduct would affect a portion of a linear vernal pool that appears to feed into a  
 36 large pool further downslope and would be within 30 feet of another pool. Constructing these  
 37 facilities could result in a permanent change to the hydrology of this aquatic habitat from a  
 38 reduction in the size of the supporting watershed and the potential to alter the subsurface

1 hydrology, subsequently reducing the habitat's ability to support foraging habitat (vernal pool  
2 plants) for vernal pool terrestrial invertebrates.

3 Construction activities associated with all project alternatives could result in the injury or mortality  
4 of vernal pool terrestrial invertebrates occurring in habitats that are subject to direct ground  
5 disturbance and vehicle traffic, or if hazardous construction materials are spilled in areas occupied  
6 by the species. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2:  
7 *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
8 *Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
9 *Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1)  
10 training construction staff on protecting sensitive biological resources and reporting requirements;  
11 (2) implementing spill prevention and containment plans that would avoid material spills that could  
12 directly harm vernal pool terrestrial invertebrates and affect the viability of habitat; and (3) having  
13 a biological monitor present to ensure that non-disturbance buffers and associated construction  
14 fencing are intact and all other protective measures are being implemented, where applicable.

15 No CNDDB (California Department of Fish and Wildlife 2020a) occurrences of molestan blister  
16 beetle or vernal pool andrenid bee would be permanently, temporarily, or indirectly affected by  
17 project construction for any of the project alternatives.

18 Field investigations for all project alternatives would be conducted prior to and during construction  
19 to more specifically identify appropriate construction methods and design criteria addressed in the  
20 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
21 and address the establishment of geological and groundwater monitoring programs (Delta  
22 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
23 variety of ground-disturbing activities that would vary in duration from several hours to  
24 approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
25 Construction Authority 2022a, 2022b) and could result in impacts on habitat and the potential for  
26 injury and mortality of vernal pool terrestrial invertebrates. Geotechnical investigations that would  
27 occur in the West Tracy Fault Study area and over the tunnel alignment footprints, which include  
28 test trenches, CPTs, soil borings, and geophysical arrays, would result in temporary impacts on  
29 habitat (Appendix 13C). Geotechnical investigations associated with the tunnels linking the  
30 Southern Forebay to the South Delta Outlet and Control Structure (Alternatives 1, 2a, 2b, 2c, 3, 4a,  
31 4b, and 4c) would avoid impacts on vernal pool habitat as specified in Environmental Commitment  
32 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B), which  
33 commits to avoiding impacts on wetlands. The Bethany Fault Study investigations would not affect  
34 modeled vernal pool terrestrial invertebrate habitat. The following field investigations would be  
35 conducted within proposed surface construction footprints of project facilities (including portions of  
36 tunnel alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT,  
37 groundwater testing and monitoring, monument installation, pilot studies for settlement, agronomic  
38 testing, and utility potholing. These temporary impacts are not characterized as an additional loss of  
39 habitat because impacts for these locations have already been quantified within the construction  
40 footprints. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop*  
41 *and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
42 *Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
43 *Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1)  
44 training construction staff on protecting sensitive biological resources and reporting requirements;  
45 (2) implementing spill prevention and containment plans that would avoid material spills that could  
46 directly harm vernal pool terrestrial invertebrates and affect the viability of habitat; and (3) having

1 a biological monitor present to ensure that non-disturbance buffers and associated construction  
2 fencing are intact and all other protective measures are being implemented, where applicable.

### 3 Operations

4 None of the project alternatives are anticipated to result in operational impacts on vernal pool  
5 terrestrial invertebrates or habitat because operating conveyance facilities would not involve  
6 disturbance or removal of habitat or effects on vernal pool terrestrial invertebrates.

### 7 Maintenance

8 The maintenance of the Southern Complex on Byron Tract and west of Byron Highway (Alternatives  
9 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) could result in impacts on vernal pool terrestrial invertebrates.

10 Maintenance at the Southern Forebay and South Delta Outlet and Control Structure (Alternatives 1,  
11 2a, 2b, 2c, 3, 4a, 4b, and 4c) would include repaving of access roads every 15 years, quarterly weed  
12 management (e.g., mechanical removal and herbicide application), and semiannual general and  
13 ground maintenance (e.g., mowing, vegetation trimming) could result in the injury, mortality, and  
14 disruption of normal behaviors of vernal pool terrestrial invertebrates and impacts on flowering  
15 plants occurring immediately adjacent to where these activities are taking place.

16 No maintenance activities at the Bethany Complex (Alternative 5) are anticipated to result in  
17 impacts on vernal pool terrestrial invertebrates because there are no aboveground facilities that  
18 occur within 250 feet of aquatic habitat. The Bethany Reservoir Aqueduct would be within 250 feet  
19 of vernal pools; however, the aqueduct would be buried and maintenance would be limited to  
20 vegetation management around manways (i.e., access points to buried pipelines), which would be  
21 more than 500 feet from the nearest pool and would not likely result in direct or indirect effects on  
22 these pools.

### 23 **CEQA Conclusion—All Project Alternatives**

24 The construction of all project alternatives and the maintenance of Alternatives 1, 2a, 2b, 2c, 3, 4a,  
25 4b, and 4c would result in impacts on vernal pool terrestrial invertebrates through the permanent  
26 and temporary loss of modeled habitat and the potential for injury and mortality of these species.

27 The temporary loss of habitat and the potential impacts of injury and mortality from project  
28 construction would be reduced by Environmental Commitments EC-1: *Conduct Worker Awareness*  
29 *Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and*  
30 *Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best*  
31 *Management Practices for Biological Resources* (Appendix 3B). Even with these environmental  
32 commitments, however, the loss of habitat from the construction of the alternatives and the  
33 potential for injury, mortality, and disruption of normal behaviors from construction and  
34 maintenance activities on vernal pool terrestrial invertebrates would be significant. Implementation  
35 of the CMP would offset the loss of vernal pool terrestrial invertebrate habitat, which would be  
36 achieved through the purchase of mitigation credits specifically for impacts on vernal pool fairy  
37 shrimp and vernal pool tadpole shrimp at a USFWS-approved mitigation bank (Appendix 3F, Section  
38 3F.3.3.3 and Attachment 3F.1, Table 3F.1-3 CMP-11: *Vernal Pool Fairy Shrimp and Vernal Pool*  
39 *Tadpole Shrimp Habitat*), which would also benefit the vernal pool terrestrial invertebrates analyzed  
40 and reduce the impact associated with habitat loss to less than significant. Mitigation Measures BIO-  
41 2b: *Avoid and Minimize Impacts on Terrestrial Biological Resources from Maintenance* and BIO-14:

1 *Avoid and Minimize Impacts on Vernal Pool Aquatic Invertebrates and Critical Habitat for Vernal Pool*  
2 *Fairy Shrimp*, which would also benefit terrestrial species, would be required to avoid and minimize  
3 the potential for injury, mortality, disruption of normal behaviors, and disturbances to habitat. The  
4 impacts on vernal pool terrestrial invertebrates from the project alternatives would be less than  
5 significant with mitigation because these aforementioned measures would replace lost habitat and  
6 reduce direct effects on the species, including habitat disturbance, by avoiding and minimizing  
7 activities during construction and maintenance that could adversely affect habitat, which include  
8 establishing non-disturbance buffers around habitat with construction fencing, and by avoiding  
9 indirect effects on vernal pool habitat to the extent practicable.

#### 10 **Mitigation Measure CMP: Compensatory Mitigation Plan**

11 DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to  
12 offset the loss of vernal pool habitat (Appendix 3F, Section 3F.3.3.3 and Attachment 3F.1, Table  
13 3F.1-3, CMP-11: *Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp Habitat*) by  
14 purchasing credits at a USFWS-approved mitigation bank or at a non-bank site approved by  
15 USFWS supporting habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp, which  
16 would also benefit vernal pool terrestrial invertebrates. Though these mitigation areas would be  
17 specifically targeting vernal pool fairy shrimp and vernal pool tadpole shrimp, they would be  
18 within the range of these vernal pool terrestrial invertebrates and would generally provide  
19 suitable conditions for them to occur there.

#### 20 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 21 **Resources from Maintenance Activities**

22 See description of Mitigation Measure BIO-2b under Impact BIO-2.

#### 23 **Mitigation Measure BIO-14: Avoid and Minimize Impacts on Vernal Pool Aquatic** 24 **Invertebrates and Critical Habitat for Vernal Pool Fairy Shrimp**

25 See description of Mitigation Measure BIO-14 under Impact BIO-14.

#### 26 ***Mitigation Impacts***

27 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
28 mitigation measure impacts. The analyses below consider the potential impacts associated with  
29 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
30 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
31 *Measures*.

#### 32 **Compensatory Mitigation**

33 Implementation of the CMP could result in impacts on vernal pool terrestrial invertebrates through  
34 tidal wetland habitat restoration and channel margin enhancement because potential areas  
35 identified include the Cache Slough Complex and Yolo Bypass (Appendix 3F, Section 3F.4.3.4.2),  
36 which are adjacent to modeled habitat for vernal pool terrestrial invertebrates and there are two  
37 records for andrenid bee in the vicinity of the Cache Slough Complex. Grading and fill to support  
38 these activities could directly affect habitat or result in changes to topography and soils such that  
39 the hydrology of vernal pools supporting these species is altered.

1 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
2 species under the project's CMP on Bouldin Island and the I-5 ponds would not result in effects on  
3 vernal pool terrestrial invertebrates because there is no habitat for these species in these areas.

4 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
5 enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in the temporary  
6 disturbance of existing habitat and the potential for injury or mortality of vernal pool terrestrial  
7 invertebrates but would ultimately provide benefits for these species. Site-specific analyses are not  
8 provided because locations of potential non-bank sites are not currently known.

9 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
10 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
11 management of agricultural areas but may also include natural communities in the study area  
12 (Appendix 3F, Section 3F.4.2.2 and Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
13 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
14 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
15 CMP-22b: *Tricolored Blackbird Foraging Habitat*). Vernal pool complexes would not be targeted for  
16 these specific site protection instruments so there would not likely be any effects on vernal pool  
17 terrestrial invertebrates. Site-specific analyses are not provided because locations of potential  
18 protection instruments are not currently known.

19 The CMP and site-specific permitting approvals would account for any losses of vernal pool habitat  
20 from tidal wetland habitat restoration and channel margin enhancement by mitigating for any  
21 habitat losses (Appendix 3F, Section 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0:  
22 *General Design Guidelines*), and therefore reducing any habitat losses associated with the CMP to a  
23 less-than-significant level. The habitat creation activities would also have the potential to cause  
24 injury and mortality of vernal pool terrestrial invertebrates. Environmental Commitments EC-1:  
25 *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management*  
26 *Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and  
27 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would  
28 reduce the potential for injury and mortality to a less-than-significant level. These impacts would be  
29 less than significant because the aforementioned measures would (1) train construction staff on the  
30 needs of protecting vernal pools and associated uplands, reporting requirements, and the  
31 ramifications of not following these measures; (2) implement spill prevention and containment  
32 plans that would avoid material spills that could affect the viability of nearby pools; and (3) have a  
33 biological monitor present to ensure that non-disturbance buffers and associated construction  
34 fencing are intact and all other protective measures are being implemented, where applicable.

35 The impacts on vernal pool terrestrial invertebrates from the project alternatives with the CMP  
36 would be less than significant with mitigation.

### 37 Other Mitigation Measures

38 Some mitigation measures would involve ground disturbance, the use of heavy equipment, or  
39 inadvertent discharge of construction-related fluids or sediment within 250 feet of vernal pools that  
40 would have the potential to have direct and indirect impacts on modeled habitat or result in injury  
41 or mortality of vernal pool terrestrial invertebrates due to discharge of sediment and hazardous  
42 materials. Construction-related grading and excavation could result in direct and indirect impacts on  
43 vernal pool terrestrial invertebrate modeled habitat and could result in the mortality of individuals.  
44 The mitigation measures with potential to result in impacts on vernal pool terrestrial invertebrates

1 are similar to those discussed under Impact BIO-14: *Impacts of the Project on Vernal Pool Aquatic*  
 2 *Invertebrates*. Impacts on vernal pool terrestrial invertebrates resulting from implementation of  
 3 mitigation measures would be similar to construction effects of the project alternatives in certain  
 4 construction areas and would contribute to vernal pool terrestrial invertebrate impacts of the  
 5 project alternatives. The impacts of habitat loss, ground disturbance, noise, visual disturbance, and  
 6 exposure to dust or hazardous materials on vernal pool terrestrial invertebrates would be reduced  
 7 through the CMP and environmental commitments as detailed under Impact BIO-14. In addition,  
 8 Mitigation Measure BIO-14: *Avoid and Minimize Impacts on Vernal Pool Aquatic Invertebrates and*  
 9 *Critical Habitat for Vernal Pool Fairy Shrimp* would require species-specific measures to reduce  
 10 these impacts. Therefore, implementation of other mitigation measures is unlikely to affect vernal  
 11 pool terrestrial invertebrates.

12 Overall, the impacts on vernal pool terrestrial invertebrates from construction of compensatory  
 13 mitigation and implementation of other mitigation measures, combined with project alternatives,  
 14 would not change the impact conclusion from less than significant with mitigation.

### 15 **Impact BIO-17: Impacts of the Project on Sacramento and Antioch Dunes Anthicid Beetles**

16 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
 17 information on the Antioch Dunes and Sacramento anthicid beetles life histories are presented in  
 18 the following species accounts in Appendix 13B: Section 13B.37, *Antioch Dunes Anthicid Beetle*, and  
 19 Section 13B.38, *Sacramento Anthicid Beetle*.

### 20 ***All Project Alternatives***

#### 21 *Construction*

22 The construction of the project alternatives (all alternatives) is not anticipated to result in impacts  
 23 on habitat or result in the injury or mortality of Sacramento and Antioch Dunes anthicid beetles  
 24 (Table 13-53). Based on a review of aerial imagery, there are no suitable dredge spoil piles (sandy  
 25 spoils) within or adjacent to the construction footprint for any of the project alternatives and there  
 26 are no activities proposed near the Antioch Dunes. A review of intake locations and levee  
 27 improvement areas did not reveal any sandbars along the channel margins. These portions of the  
 28 Sacramento River have steep channel banks lined with riprap that are likely not conducive to the  
 29 formation of sandbars. The nearest occurrence for either species to the facilities for the project  
 30 alternatives is an extant occurrence of Sacramento anthicid beetle from 1974 near Rio Vista, which  
 31 is 1.25 miles from the park-and-ride lot off SR 12 (California Department of Fish and Wildlife  
 32 2020a).

33 **Table 13-53. Impacts on Habitat for Sacramento and Antioch Dunes Anthicid Beetles by**  
 34 **Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
All Alternatives	0.00	0.00	0.00

35 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 36 discussion in Section 13.3.1.2.

1        Operations

2        The operations of the project alternatives are not anticipated to result in effects on Sacramento and  
3        Antioch Dunes anthicid beetles or their habitat because changes in flows are not anticipated to  
4        result in changes to the extent of habitat and because no suitable habitat or species records were  
5        identified near project facilities.

6        Maintenance

7        The maintenance of the project alternatives is not anticipated to result in impacts on Sacramento  
8        and Antioch Dunes anthicid beetles or their habitat because no suitable habitat or species records  
9        were identified near project facilities.

10       **CEQA Conclusion—All Project Alternatives**

11       All project alternatives would result in no impact on Sacramento and Antioch Dunes anthicid beetles  
12       because no known habitat or records for these species occurs in the vicinity of project construction,  
13       operations, or maintenance areas.

14       **Mitigation Impacts**

15       As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
16       mitigation measure impacts. The analyses below consider the potential impacts associated with  
17       implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
18       Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
19       *Measures*.

20       Compensatory Mitigation

21       CMP activities on Bouldin Island and the I-5 ponds would not result in impacts on Sacramento and  
22       Antioch Dunes anthicid beetles because these areas do not contain habitat for the species. Tidal  
23       restoration would not likely result in impacts on these species because the areas prioritized (lower  
24       Yolo Bypass and Cache Slough) are outside of areas of known occurrences and generally do not have  
25       areas where dredge spoil piles are located. The areas selected for potential channel margin  
26       enhancement, which includes areas along the Sacramento River and its tributaries, could potentially  
27       occur in areas where these species are known to occur or where there is potential habitat (Appendix  
28       3F, Section 3F.4.3.4.2). Grading and fill to support channel margin enhancement could directly affect  
29       habitat and the species.

30       In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
31       enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
32       vernal pool complexes, alkaline seasonal wetlands, or grasslands are located, which are not habitats  
33       for Sacramento and Antioch Dunes anthicid beetles; therefore, there would not likely be any effects  
34       on these species. Site-specific analyses are not provided because locations of potential non-bank  
35       sites are not currently known.

36       Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
37       crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
38       management of agricultural areas but may also include natural communities in the study area  
39       (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
40       *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,



1 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
2 CMP-22b: *Tricolored Blackbird Foraging Habitat*). Areas of potential Sacramento and Antioch Dunes  
3 anthicid beetle habitat would not be targeted for these specific site protection instruments so there  
4 would not likely be any effects on these species. Site-specific analyses are not provided because  
5 locations of potential protection instruments are not currently known.

6 The CMP and site-specific permitting approvals would account for any losses of anthicid beetle  
7 habitat from channel margin enhancement by mitigating for any habitat losses (Appendix 3F,  
8 Section 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General Design Guidelines*),  
9 and therefore reducing any habitat losses associated with the CMP to a less-than-significant level.  
10 The habitat creation and enhancement activities would also have the potential to cause injury and  
11 mortality of Sacramento and Antioch Dunes anthicid beetles. Environmental Commitments EC-1:  
12 *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management*  
13 *Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and  
14 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would  
15 reduce the potential for injury and mortality to a less-than-significant level. These impacts would be  
16 less than significant because the aforementioned measures would (1) train construction staff on the  
17 needs of protecting habitat, reporting requirements, and the ramifications of not following these  
18 measures; (2) implement spill prevention and containment plans that would avoid material spills  
19 that could affect the viability of nearby habitat; and (3) have a biological monitor present to ensure  
20 that non-disturbance buffers and associated construction fencing are intact and all other protective  
21 measures are being implemented, where applicable.

22 The impact on Sacramento and Antioch Dunes anthicid beetles from the project alternatives with the  
23 CMP would be less than significant with mitigation.

#### 24 Other Mitigation Measures

25 Other mitigation measures proposed would not have impacts on Sacramento and Antioch Dunes  
26 anthicid beetles because no known habitat or records for these species occurs in the vicinity of  
27 project construction.

28 Overall, the impacts on Sacramento and Antioch Dunes anthicid beetles from construction of  
29 compensatory mitigation and implementation of other mitigation measures, combined with project  
30 alternatives, would not change the no impact conclusion for the project alternatives and the  
31 compensatory mitigation conclusion of less than significant with mitigation.

#### 32 **Impact BIO-18: Impacts of the Project on Valley Elderberry Longhorn Beetle**

33 The methods for the analysis of effects on valley elderberry longhorn beetle appear in Section  
34 13.3.1.1 and information on the species life history and habitat suitability model are presented in  
35 the species account in Appendix 13B, Section 13B.39, *Valley Elderberry Longhorn Beetle*.

#### 36 **All Project Alternatives**

##### 37 Construction

38 The construction of all the project alternatives would affect modeled riparian habitat for valley  
39 elderberry longhorn beetle through the permanent and temporary loss of modeled habitat, and  
40 habitat fragmentation. The loss of habitat would primarily occur as a result of the levee

1 improvement work, new roads and road improvements, and the intake construction (Appendix  
 2 13C). The central alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would result in greater  
 3 impacts on modeled habitat compared to the eastern alignment alternatives (Alternatives 3, 4a, 4b,  
 4 and 4c) and the Bethany Reservoir alignment (Alternative 5) largely because of the levee  
 5 improvements on Bouldin Island and road improvements throughout the central alignment (Table  
 6 13-54). The losses of habitat would result from vegetation removal in advance of grading and  
 7 excavation for the construction of project infrastructure. Also, work within 165 feet of host  
 8 elderberry shrubs could result in dust and the discharge of construction-related fluids, which could  
 9 affect the vigor of shrubs, resulting in a further loss of habitat for valley elderberry longhorn beetle.  
 10 Environmental Commitment EC-14: *Construction Best Management Practices for Biological Resources*  
 11 would ensure that temporarily disturbed areas are restored (Appendix 3B).

12 **Table 13-54. Impacts on Modeled Habitat for Valley Elderberry Longhorn Beetle by Alternative**

Alternative	Permanent Riparian Impacts (acres) <sup>a</sup>	Temporary Riparian Impacts (acres)	Total (acres)
1	54.52	17.50	72.02
2a	55.00	20.02	75.02
2b	49.08	19.06	68.14
2c	51.59	19.55	71.14
3	16.72	10.57	27.29
4a	19.41	11.20	30.61
4b	13.50	10.24	23.74
4c	16.01	10.71	26.72
5	19.47	9.84	29.31

13 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 14 discussion in Section 13.3.1.2.

15 Construction activities associated with all alternatives could result in the injury, mortality, or the  
 16 disruption of normal behaviors of valley elderberry longhorn beetle during the removal of occupied  
 17 shrubs, construction material spills in areas where shrubs occur, or if work is conducted adjacent to  
 18 habitat during the flight season (March to July), which could disrupt feeding, breeding, and dispersal  
 19 and cause potential injury or mortality of valley elderberry longhorn beetle. These effects may occur  
 20 in modeled riparian habitat as well as other potential habitat included as part of the model.

21 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
 22 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
 23 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
 24 *Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training  
 25 construction staff on the needs of protecting elderberry shrubs, reporting requirements, and the  
 26 ramifications for not following these measures; (2) implementing spill prevention and containment  
 27 plans that would avoid material spills that could affect the viability of nearby elderberry shrubs; and  
 28 (3) having a biological monitor present to ensure that non-disturbance buffers and associated  
 29 construction fencing are intact and all other protective measures are being implemented; where  
 30 applicable. These measures would be applied where shrubs are identified within or adjacent to  
 31 work areas, regardless of the presence of modeled habitat.

32 No CNDDDB (California Department of Fish and Wildlife 2020a) occurrences of valley elderberry  
 33 longhorn beetle would be permanently or temporarily affected by project construction for any of the

1 alternatives. The nearest CNDDDB occurrence to the project alternatives is on Union Island, which is  
2 approximately 4 miles south of road improvements on Upper Jones Tract for Alternatives 3, 4a, 4b,  
3 4c, and 5, and 4 miles south of road improvements on Roberts Island for Alternatives 1, 2a, 2b, and  
4 2c (California Department of Fish and Wildlife 2020a).

5 Field investigations for all project alternatives would be conducted prior to and during construction  
6 to more specifically identify appropriate construction methods and design criteria addressed in the  
7 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
8 and address the establishment of geological and groundwater monitoring programs (Delta  
9 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
10 variety of ground-disturbing activities that would vary in duration from several hours to  
11 approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
12 Construction Authority 2022a, 2022b). and could result in impacts on habitat and the potential for  
13 injury, mortality, and the disruption of normal behaviors of valley elderberry longhorn  
14 beetle. Geotechnical investigations associated with the tunnels for all project alternatives, which  
15 include CPTs and soil borings would result in temporary impacts on modeled habitat (Appendix  
16 13C). The West Tracy Fault Study and the Bethany Fault Study investigations would not affect  
17 modeled habitat for valley elderberry longhorn beetle. The following field investigations would be  
18 conducted within proposed surface construction footprints of project facilities (including portions of  
19 tunnel alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT,  
20 groundwater testing and monitoring, monument installation, pilot studies for settlement, agronomic  
21 testing, and utility potholing. These temporary impacts are not characterized as an additional loss of  
22 habitat because impacts for these locations have already been quantified within the construction  
23 footprints, but could still result in the potential for injury, mortality, and the disruption of normal  
24 behaviors of valley elderberry longhorn beetle, as discussed above for conveyance facility  
25 construction. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2:  
26 *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
27 *Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
28 *Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (2)  
29 training construction staff on the needs of protecting elderberry shrubs, reporting requirements,  
30 and the ramifications for not following these measures; (2) implementing spill prevention and  
31 containment plans that would avoid material spills that could affect the viability of nearby  
32 elderberry shrubs; and (3) having a biological monitor present to ensure that non-disturbance  
33 buffers and associated construction fencing are intact and all other protective measures are being  
34 implemented, where applicable. These measures would be applied where shrubs are identified  
35 within or adjacent to work areas, regardless of the presence of modeled habitat.

### 36 Operations

37 None of the project alternatives would directly result in operational impacts on valley elderberry  
38 longhorn beetle or habitat because operating conveyance facilities would not involve disturbance or  
39 removal of habitat or effects on the species.

40 Valley elderberry longhorn beetle is known to occur along rivers upstream of the study area that  
41 could potentially be indirectly affected by the operation of the project. Chapter 5, *Surface Water*,  
42 details the hydrologic modeling methods (Chapter 5, *Surface Water*, Appendix 5A, *Modeling*  
43 *Technical Appendix*, Section B, *Hydrology and Systems Operations Modeling*) and results (Chapter 5,  
44 Appendix 5A, Section B, Attachment 3, *CalSim 3 Modeling Results*) with respect to flows within and  
45 upstream of the Delta. Modeled flows under all project alternatives are not expected to change

1 substantially beyond the existing variation in flows. Thus, the project is not anticipated to alter  
2 riparian vegetation and shrubs occurring there relative to existing conditions.

### 3 Maintenance

4 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
5 in impacts on valley elderberry longhorn beetle. Maintenance activities across all facilities that could  
6 affect valley elderberry longhorn beetle include repaving of access roads every 15 years, semiannual  
7 general and ground maintenance (e.g., mowing, vegetation trimming, herbicide application), and  
8 daily or weekly inspections by vehicle; these maintenance activities could affect shrubs that  
9 establish or occur adjacent to facilities (e.g., herbicide drift, damage to shrubs) and could result in  
10 the injury, mortality, and disruption of normal behaviors (i.e., feeding, breeding, and dispersal) of  
11 valley elderberry longhorn beetle larvae occupying affected shrubs and adults if activities occur  
12 during the flight season (March to July).

### 13 **CEQA Conclusion—All Project Alternatives**

14 Construction and maintenance of all project alternatives would result in impacts on valley  
15 elderberry longhorn beetle through the permanent and temporary loss of modeled riparian habitat,  
16 habitat fragmentation, and the potential for injury, mortality, and the disruption of normal  
17 behaviors.

18 The temporary loss of habitat and the potential impacts of injury, mortality, and the disruption of  
19 normal behaviors of larvae and adults from project construction would be reduced by  
20 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
21 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
22 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
23 *Biological Resources* (Appendix 3B). Even with these commitments, however, the loss of habitat from  
24 the construction of the alternatives, and the potential for injury, mortality, and disruption of normal  
25 behaviors from construction and maintenance activities on valley elderberry longhorn beetle would  
26 be significant. Implementation of the CMP would be required to offset the loss of riparian habitat  
27 (Appendix 3F, Section 3F.3.2.3) and individual elderberry shrubs (Appendix 3F, Section 3F.3.3.1 and  
28 Attachment 3F.1, Table 3F.1-3, CMP-12: *Valley Elderberry Longhorn Beetle Habitat*), which would  
29 reduce the impact associated with habitat loss to a less-than-significant level. Mitigation Measures  
30 BIO-2b: *Avoid and Minimize Impacts on Terrestrial Biological Resources from Maintenance Activities*  
31 and BIO-18: *Avoid and Minimize Impacts on Valley Elderberry Longhorn Beetle* would be required to  
32 avoid and minimize the potential for injury, mortality, disruption of normal behaviors, and  
33 disturbances to habitat. The impacts on valley elderberry longhorn beetle from the project  
34 alternatives would be less than significant with mitigation because these aforementioned measures  
35 would replace lost habitat and reduce direct effects on the species, including habitat disturbance, by  
36 avoiding and minimizing activities that could injure or kill valley elderberry longhorn beetle, which  
37 includes establishing non-disturbance buffers around shrubs with construction fencing, limiting  
38 trimming of shrubs to stems less likely to contain larvae (<1 inch in diameter) and during periods  
39 when trimming is less likely to affect the vigor of shrubs, and avoiding work to the extent possible  
40 during the species active season when they are in flight around shrubs and dispersing.

### **Mitigation Measure CMP: Compensatory Mitigation Plan**

DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to offset the loss of riparian habitat (Appendix 3F, Section 3F.3.2.3) by creating riparian habitat on Bouldin Island and at the I-5 ponds and managing these areas in perpetuity. As stated in Appendix 3F, Section 3F.3.3.1 and Attachment 3F.1, Table 3F.1-3, CMP-12: *Valley Elderberry Longhorn Beetle Habitat*, mitigation would follow the guidance in USFWS's 2017 *Framework for Assessing Impacts on Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus)* (2017 Framework), which would create and protect areas where elderberry shrubs can be planted and receive shrubs suitable for transplantation. Channel margin restoration would include riparian plantings on rock benches (Appendix 3F, Section 3F.4.3.3.3) that may provide opportunities for the establishment of elderberry shrubs and future colonization by valley elderberry longhorn beetle.

### **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological Resources from Maintenance Activities**

See description of Mitigation Measure BIO-2b under Impact BIO-2.

### **Mitigation Measure BIO-18: Avoid and Minimize Impacts on Valley Elderberry Longhorn Beetle**

#### ***All Project Alternatives***

As properties become accessible for initiating project activities, DWR will require surveys for elderberry shrubs to be conducted in construction areas by a USFWS-approved biologist. Elderberry shrubs will be avoided to the maximum extent practicable. Complete avoidance (i.e., no adverse effects) will be assumed when a buffer of at least 165 feet is established and maintained around elderberry shrubs containing stems measuring 1 inch or greater in diameter at ground level (U.S. Fish and Wildlife Service 2017a:10, 11).

Elderberry shrubs that have stems measuring 1 inch or greater in diameter at ground level determined or assumed to be occupied, according to the criteria in the 2017 Framework or the most recent available guidance at that time, that are identified within project footprints that cannot be avoided (i.e., those in the project footprint) will be transplanted to conservation areas identified in the CMP. Transplanting will follow the guidance outlined in USFWS's 2017 *Framework for Assessing Impacts on Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus)* (2017 Framework) or the most recent available guidance at that time.

For shrubs not directly affected by construction but that occur within 165 feet of ground-disturbing activities, the following measures will be implemented, which come from the USFWS 2017 Framework.

1. Fencing. All areas to be avoided during construction activities will be fenced and flagged as close to construction limits as feasible.
2. Avoidance area. Activities that may damage or kill an elderberry shrub (e.g., trenching, paving, etc.) may need an avoidance area of at least 20 feet from the drip-line, depending on the type of activity.
3. Timing. As much as feasible, all activities that occur within 165 feet of an elderberry shrub, will be conducted outside of the flight season of the species (March to July).

- 1           4. Trimming. Trimming may remove or destroy valley elderberry longhorn beetle eggs and/or  
2 larvae and may reduce the health and vigor of the elderberry shrub. In order to avoid and  
3 minimize adverse effects on valley elderberry longhorn beetle, trimming will occur between  
4 November 1 and February 1 and will avoid the removal of any branches or stems that are  $\geq$   
5 1 inch in diameter. Measures to address regular or largescale maintenance (trimming)  
6 should be established in consultation with USFWS.
- 7           5. Chemical usage. Herbicides will not be used within the drip-line of an elderberry shrub.  
8 Insecticides will not be used within 100 feet of an elderberry shrub. All chemicals will be  
9 applied using a backpack sprayer or similar direct-application method.

## 10           ***Mitigation Impacts***

11           As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
12 mitigation measure impacts. The analyses below consider the potential impacts associated with  
13 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
14 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
15 *Measures*.

### 16           *Compensatory Mitigation*

17           The creation and enhancement of wetlands and other waters as well as habitat for special-status  
18 species on Bouladin Island and the I-5 ponds under the project's CMP would affect modeled riparian  
19 habitat for valley elderberry longhorn beetle (Appendix 13C) from vegetation removal and grading  
20 to create the appropriate topography and soil conditions to establish or restore habitats. The CMP  
21 could also affect modeled riparian habitat for valley elderberry longhorn beetle through tidal  
22 wetland habitat restoration and channel margin enhancement because potential areas identified  
23 generally overlap with modeled habitat (Appendix 3F, Section 3F.4.3.4.2).

24           In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
25 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
26 vernal pool complexes, alkaline seasonal wetlands, or grasslands are located, which are not habitats  
27 for valley elderberry longhorn beetle; therefore, there would not likely be any effects on this species.  
28 Site-specific analyses are not provided because locations of potential non-bank sites are not  
29 currently known.

30           Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
31 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
32 management of agricultural areas but may also include natural communities in the study area  
33 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
34 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
35 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
36 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could potentially contain elderberry  
37 shrubs and management activities could affect this habitat and result in the disruption of normal  
38 behaviors, injury, and mortality. Site-specific analyses are not provided because locations of  
39 potential protection instruments are not currently known.

40           The CMP and site-specific permitting approvals would account for any losses of valley elderberry  
41 habitat from habitat creation by adjusting the overall commitment of riparian habitat creation and  
42 elderberry shrub planting and transplanting (Appendix 3F, Section 3F.1, Section 3F.2.4, and

1 Attachment 3F.1, Table 3F.1-2, CMP-0: *General Design Guidelines*), therefore reducing any habitat  
2 losses associated with the CMP to a less-than-significant level. The creation and enhancement  
3 activities would also have the potential to cause injury, mortality, and the disruption of normal  
4 behaviors of valley elderberry longhorn beetle. Environmental Commitments EC-1: *Conduct Worker*  
5 *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
6 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
7 *Construction Best Management Practices for Biological Resources* (Appendix 3B) and Mitigation  
8 Measure BIO-18: *Avoid and Minimize Impacts on Valley Elderberry Longhorn Beetle* would reduce the  
9 potential for injury, mortality, and the disruption of normal behaviors of individuals to a less-than-  
10 significant level. These impacts would be less than significant because the aforementioned measures  
11 would (2) train construction staff on the needs of protecting elderberry shrubs, reporting  
12 requirements, and the ramifications of not following these measures; (2) implement spill prevention  
13 and containment plans that would avoid material spills that could affect the viability of nearby  
14 elderberry shrubs; and (3) have a biological monitor present to ensure that non-disturbance buffers  
15 and associated construction fencing are intact and all other protective measures are being  
16 implemented, where applicable.

17 The impact on valley elderberry longhorn beetle from the project alternatives with the CMP would  
18 be less than significant with mitigation.

#### 19 Other Mitigation Measures

20 Some mitigation measures would involve ground disturbance, the use of heavy equipment, or  
21 inadvertent discharge of construction-related fluids or dust within 165 feet of host elderberry  
22 shrubs that would have the potential to have direct and indirect impacts on modeled habitat or  
23 result in injury or mortality of valley elderberry longhorn beetle due to discharge of dust and  
24 hazardous materials. Construction-related grading and excavation could result in direct and indirect  
25 impacts on valley elderberry longhorn beetle modeled habitat and could result in injury, mortality,  
26 or disruption of normal behavior of individuals. Impacts on valley elderberry longhorn beetle  
27 resulting from implementation of mitigation measures would be similar to construction effects of  
28 the project alternatives in certain construction areas and would contribute to valley elderberry  
29 longhorn beetle impacts of the project alternatives.

30 However, the impacts of habitat loss, ground disturbance, and exposure to dust or hazardous  
31 materials on valley elderberry longhorn beetle would be reduced through the CMP; Environmental  
32 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
33 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
34 *Countermeasure Plans*; EC-14: *Construction Best Management Practices for Biological Resources*; and  
35 Mitigation Measure BIO-18: *Avoid and Minimize Impacts on Valley Elderberry Longhorn Beetle*.  
36 Therefore, impacts on valley elderberry longhorn beetle from implementation of other mitigation  
37 measures would be reduced to less than significant.

38 Overall, the impacts on valley elderberry longhorn beetle from construction of compensatory  
39 mitigation and implementation of other mitigation measures, combined with project alternatives,  
40 would not change the impact conclusion from less than significant with mitigation.

## 1 **Impact BIO-19: Impacts of the Project on Delta Green Ground Beetle**

2 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
 3 information on the species life history and habitat suitability model for delta green ground beetle  
 4 are presented in the species account in Appendix 13B, Section 13B.40, *Delta Green Ground Beetle*.

### 5 ***All Project Alternatives***

#### 6 *Construction*

7 The construction of the project alternatives (all alternatives) would not result in impacts on delta  
 8 green ground beetle (Table 13-55). The modeled habitat for delta green ground beetle depicted in  
 9 Figure 13B.40-1 is more than 9 miles from the nearest project feature, the park-and-ride off SR 12  
 10 on Brannan Island, and the nearest CNDDDB record is more than 10 miles from this same feature  
 11 (California Department of Fish and Wildlife 2020a).

12 **Table 13-55. Impacts on Modeled Habitat for Delta Green Ground Beetle by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
All Alternatives	0.00	0.00	0.00

13 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 14 discussion in Section 13.3.1.2.

#### 15 *Operations*

16 The operations of the project alternatives (all alternatives) would not result in impacts on delta  
 17 green ground beetle because of the distance of modeled and known occupied habitat from the  
 18 infrastructure and any affected Delta waterways.

#### 19 *Maintenance*

20 The maintenance of the project alternatives (all alternatives) would not result in impacts on delta  
 21 green ground beetle because of the distance of modeled and known occupied habitat from the  
 22 project infrastructure

### 23 ***CEQA Conclusion—All Project Alternatives***

24 All project alternatives would result in no impact on delta green ground beetle because no modeled  
 25 or known habitat for this species occurs in the vicinity of project construction, operations, or  
 26 maintenance areas.

### 27 ***Mitigation Impacts***

28 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
 29 mitigation measure impacts. The analyses below consider the potential impacts associated with  
 30 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
 31 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
 32 *Measures*.



1        Compensatory Mitigation

2        Implementation of the CMP could result in impacts on delta green ground beetle through tidal  
3        wetland habitat restoration and channel margin enhancement because one of the potential areas  
4        identified is the Cache Slough Complex (Appendix 3F, Section 3F.4.3.4.2), which is adjacent to  
5        modeled delta green ground beetle habitat and several records of the species. Grading and fill to  
6        support tidal wetland restoration and channel margin enhancement could directly affect habitat or  
7        result in changes to topography and soils such that the hydrology of areas supporting delta green  
8        ground beetle habitat.

9        The creation and enhancement of wetlands and other waters as well as habitat for special-status  
10       species under the project's CMP on Bouldin Island and the I-5 ponds would not result in effects on  
11       delta green ground beetle because there is no habitat for this species in these areas and they are  
12       outside of the known range of the species.

13       In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
14       enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in the temporary  
15       disturbance of existing habitat and the potential for injury or mortality of delta green ground beetle  
16       if these activities occur within the range of the species but could ultimately provide benefits for the  
17       species. Site-specific analyses are not provided because locations of potential non-bank sites are not  
18       currently known.

19       Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
20       crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
21       management of agricultural areas but may also include natural communities in the study area  
22       (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
23       *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
24       CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
25       CMP-22b: *Tricolored Blackbird Foraging Habitat*). Vernal pool complexes would not be targeted for  
26       these specific site protection instruments so there would not likely be any effects on delta green  
27       ground beetle. Site-specific analyses are not provided because locations of potential protection  
28       instruments are not currently known.

29       The CMP and site-specific permitting approvals would account for any losses of delta green ground  
30       beetle habitat from tidal restoration and channel margin enhancement by mitigating for any habitat  
31       losses (Appendix 3F, Section 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General*  
32       *Design Guidelines*), and therefore reducing any habitat losses associated with the CMP to a less-than-  
33       significant level. The habitat creation and enhancement activities would also have the potential to  
34       cause injury and mortality of delta green ground beetle. Environmental Commitments EC-1: *Conduct*  
35       *Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*;  
36       EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
37       *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce the  
38       potential for injury and mortality to a less-than-significant level. These impacts would be less than  
39       significant because the aforementioned measures would (1) train construction staff on the needs of  
40       protecting habitat, reporting requirements, and the ramifications of not following these measures;  
41       (2) implement spill prevention and containment plans that would avoid material spills that could  
42       affect the viability of nearby habitat; and (3) have a biological monitor present to ensure that non-  
43       disturbance buffers and associated construction fencing are intact and all other protective measures  
44       are being implemented, where applicable.

1 The impact on delta green ground beetle from the project alternatives with the CMP would be less  
2 than significant with mitigation.

### 3 Other Mitigation Measures

4 Other mitigation measures proposed would not have impacts on delta green ground beetle because  
5 no modeled or known habitat for this species occurs in the vicinity of project construction areas; the  
6 modeled habitat for delta green ground beetle depicted in Figure 13B.40-1 is more than 9 miles  
7 from the nearest project feature, the park-and-ride off SR 12 on Brannan Island, and the nearest  
8 CNDDDB record is more than 10 miles from this same feature (California Department of Fish and  
9 Wildlife 2020a).

10 Overall, the construction of compensatory mitigation and implementation of other mitigation  
11 measures, combined with project alternatives, would not change the no impact conclusion for the  
12 project alternatives and the compensatory mitigation conclusion of less than significant with  
13 mitigation.

### 14 **Impact BIO-20: Impacts of the Project on Curved-Foot Hygrotus Diving Beetle**

15 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
16 information on the species life history and habitat suitability model for curved-foot hygrotus diving  
17 beetle are presented in the species account in Appendix 13B, Section 13B.42, *Curved-Foot Hygrotus*  
18 *Diving Beetle*.

### 19 **All Project Alternatives**

#### 20 Construction

21 The construction of Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c would result in the permanent and  
22 temporary loss of curved-foot hygrotus diving beetle modeled habitat. These impacts would occur  
23 as a result of the construction of the Southern Forebay and associated infrastructure and work areas  
24 (permanent and temporary), the temporary railway (temporary), improvements to Byron Highway  
25 (permanent and temporary), the construction of the South Delta Outlet and Control Structure  
26 (permanent and temporary impacts), and Jones Outlet and Control Structure (permanent and  
27 temporary impacts under Alternatives 2a and 4a). Construction-related grading and excavation  
28 would result in the permanent and temporary loss of curved-foot hygrotus diving beetle habitat  
29 (Table 13-56). Environmental Commitment EC-14: *Construction Best Management Practices for*  
30 *Biological Resources* would ensure that temporarily disturbed areas are restored (Appendix 3B).

31 **Table 13-56. Impacts on Modeled Habitat for Curved-Foot Hygrotus Diving Beetle by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1, 2b, 2c, 4b	62.26	19.34	81.60
2a	62.73	19.36	82.09
3	62.77	19.34	82.11
4a	63.64	19.36	83.00
4c	62.55	19.34	81.89
5	4.10	3.27	7.37

32 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
33 discussion in Section 13.3.1.2.

1 The construction of Alternative 5 would also result in the permanent and temporary loss of curved-  
2 foot hygrotus diving beetle habitat as a result of the construction of the Bethany Reservoir Pumping  
3 Plant (permanent and temporary), the Bethany Reservoir Aqueduct (permanent and temporary),  
4 improvements on Mountain House Road (permanent and temporary), and the construction-water  
5 pipeline east of Byron Highway (temporary). Environmental Commitment EC-14: *Construction Best  
6 Management Practices for Biological Resources* would ensure that temporarily disturbed areas are  
7 restored (Appendix 3B).

8 Construction activities associated with the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b,  
9 and 4c) and Bethany Complex (Alternative 5) could result in the injury, mortality, and disruption of  
10 normal behaviors of curved-foot hygrotus diving beetle if individuals are occupying affected habitat  
11 when it is dewatered for project grading and excavation, or through exposure to construction-  
12 related fluids, such as fuels, oils, and cement. Environmental Commitments EC-1: *Conduct Worker  
13 Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
14 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
15 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these  
16 potential impacts by (1) training construction staff on protecting sensitive biological resources,  
17 reporting requirements, and the ramifications for not following these measures; (2) implementing  
18 spill prevention and containment plans that would avoid material spills that could affect the viability  
19 of nearby aquatic habitat; and (3) having a biological monitor present to ensure that non-  
20 disturbance buffers and associated construction fencing are intact and all other protective measures  
21 are being implemented, where applicable.

22 One CNDDDB record for curved-foot hygrotus diving beetle would be affected by the construction of  
23 the Bethany Reservoir Pumping Plant. This record (#3) is from 1989, is considered extant, and the  
24 habitat is described as an irrigation canal (California Department of Fish and Wildlife 2020a).

25 Field investigations for all project alternatives would be conducted prior to and during construction  
26 to more specifically identify appropriate construction methods and design criteria addressed in the  
27 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
28 and address the establishment of geological and groundwater monitoring programs (Delta  
29 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
30 variety of ground-disturbing activities that would vary in duration from several hours to  
31 approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
32 Construction Authority 2022a, 2022b) and could result in impacts on habitat, or the potential for  
33 injury and mortality of curved-foot hygrotus diving beetle. Geotechnical investigations that would  
34 occur in the West Tracy Fault Study area and over the tunnel alignment footprints, which include  
35 test trenches, CPTs, soil borings, and geophysical arrays, would result in temporary impacts on  
36 modeled habitat (Appendix 13C). The Bethany Fault Study investigations would not affect modeled  
37 curved-foot hygrotus diving beetle habitat. The following field investigations would be conducted  
38 within proposed surface construction footprints of project facilities (including portions of tunnel  
39 alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT,  
40 groundwater testing and monitoring, monument installation, pilot studies for settlement, agronomic  
41 testing, and utility potholing. These temporary impacts are not characterized as an additional loss of  
42 habitat because impacts for these locations have already been quantified within the construction  
43 footprints but could still result in the potential for injury and mortality of the species, as discussed  
44 above for conveyance facility construction. Environmental Commitments EC-1: *Conduct Worker  
45 Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
46 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:

1 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these  
2 potential impacts by (1) training construction staff on protecting sensitive biological resources,  
3 reporting requirements, and the ramifications for not following these measures; (2) implementing  
4 spill prevention and containment plans that would avoid material spills that could affect the viability  
5 of nearby aquatic habitat; and (3) having a biological monitor present to ensure that non-  
6 disturbance buffers and associated construction fencing are intact and all other protective measures  
7 are being implemented, where applicable.

### 8 Operations

9 None of the project alternatives would result in operational impacts on curved-foot hygrotus diving  
10 beetle or habitat because operating conveyance facilities would not involve disturbance or removal  
11 of habitat or effects on this species.

### 12 Maintenance

13 The maintenance of the Southern Complex on Byron Tract and west of Byron Highway (Alternatives  
14 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) could result in impacts on curved-foot hygrotus diving beetle.  
15 Maintenance at the Southern Forebay would include repaving of access roads every 15 years,  
16 quarterly weed management (e.g., mechanical removal and herbicide application), and semiannual  
17 general and ground maintenance (e.g., mowing, vegetation trimming) could result in impairment to  
18 the water quality of habitat occurring immediately adjacent to where these activities are taking  
19 place. Maintenance activities at the South Delta Outlet and Control Structure, which would include  
20 annual cleaning (pressure washing), semiannual general and ground maintenance (e.g., mowing,  
21 vegetation trimming, herbicide application), and daily or weekly inspections by vehicle, could result  
22 in the impairment of the water quality of habitat occurring adjacent to where these activities are  
23 taking place. These impacts would occur if chemicals used during these activities reach aquatic  
24 habitat through spills or from storm runoff.

25 Maintenance associated with Alternative 5 at the Bethany Reservoir Pumping Plant could affect  
26 curved-foot hygrotus diving beetle in similar manner as described above for the other alternatives.

### 27 ***CEQA Conclusion—All Project Alternatives***

28 The construction and maintenance of all project alternatives would result in impacts on curved-foot  
29 hygrotus diving beetle through the permanent and temporary loss of modeled habitat and the  
30 potential for injury and mortality of these species.

31 The temporary loss of habitat and the potential impacts of injury and mortality from project  
32 construction and maintenance would be reduced by Environmental Commitments EC-1: *Conduct*  
33 *Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*;  
34 *EC-3: Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
35 *Construction Best Management Practices for Biological Resources* (Appendix 3B). Even with these  
36 commitments, however, the permanent loss of habitat from the construction of the project  
37 alternatives and the potential for injury, mortality, and disruption of normal behaviors from  
38 construction and maintenance activities on curved-foot hygrotus diving beetle would be significant.  
39 Implementation of the CMP could help to offset the loss of curved-foot hygrotus diving beetle habitat  
40 through the purchase of mitigation credits specifically for impacts on vernal pool fairy shrimp and  
41 vernal pool tadpole shrimp at a USFWS-approved mitigation bank (Appendix 3F, Section 3F.3.3.3  
42 and Attachment 3F.1, Table 3F.1-3, CMP-11: *Vernal Pool Fairy Shrimp and Vernal Pool Tadpole*

1 *Shrimp Habitat*), which would also benefit curved-foot hygrotus diving beetle if the mitigation  
2 occurs within the range of the species described in Appendix 13B, Section 13B.42. With the  
3 uncertainty of where that mitigation may take place, it is possible there would be a net loss of  
4 habitat for the species in the study area. Considering that the permanent losses of modeled habitat  
5 by alternative range from 0.2% (Alternative 5) to 3% (Alternative 4a) of the species modeled habitat  
6 in the study area and that it is found in ditches and canals, which are widespread in the study area  
7 and other portions of Contra Costa County, the net loss of modeled habitat in the study area would  
8 not be a significant impact. Mitigation Measures BIO-14: *Avoid and Minimize Impacts on Vernal Pool*  
9 *Aquatic Invertebrates and Critical Habitat for Vernal Pool Fairy Shrimp*, and BIO-2b: *Avoid and*  
10 *Minimize Impacts on Terrestrial Biological Resources from Maintenance Activities* would avoid and  
11 minimize the potential for injury, mortality, disruption of normal behaviors, and disturbances to  
12 habitat. The impacts on curved-foot hygrotus beetle from the project alternatives would be less than  
13 significant with mitigation because these aforementioned measures would reduce direct effects on  
14 the species, including habitat disturbance, by avoiding and minimizing activities during construction  
15 and maintenance that could adversely affect habitat, establishing non-disturbance buffers around  
16 aquatic habitat with construction fencing and by implementing protective measures during  
17 maintenance activities.

#### 18 **Mitigation Measure CMP: Compensatory Mitigation Plan**

19 The CMP that DWR would implement (see Impact BIO-1 for a summary discussion of the CMP)  
20 could provide benefits to curved-foot hygrotus diving beetle habitat by purchasing credits at a  
21 USFWS-approved mitigation bank or at a non-bank site approved by USFWS supporting habitat  
22 for vernal pool fairy shrimp and vernal pool tadpole shrimp (Appendix 3F, Section 3F.3.3.3 and  
23 Attachment 3F.1, Table 3F.1-3, CMP-11: *Vernal Pool Fairy Shrimp and Vernal Pool Tadpole*  
24 *Shrimp Habitat*), which would also benefit curved-foot hygrotus diving beetle if the mitigation  
25 occurs within the range of the species described in Appendix 13B, Section 13B.42.

#### 26 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 27 **Resources from Maintenance Activities**

28 See description of Mitigation Measure BIO-2b under Impact BIO-2.

#### 29 **Mitigation Measure BIO-14: Avoid and Minimize Impacts on Vernal Pool Aquatic** 30 **Invertebrates and Critical Habitat for Vernal Pool Fairy Shrimp**

31 See description of Mitigation Measure BIO-14 under Impact BIO-14.

#### 32 ***Mitigation Impacts***

33 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
34 mitigation measure impacts. The analyses below consider the potential impacts associated with  
35 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
36 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
37 *Measures*.

#### 38 **Compensatory Mitigation**

39 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
40 species at the I-5 ponds and on Bouldin Island, and tidal wetland habitat restoration and channel

1 margin enhancement locations (Appendix 3F, Section 3F.4.3.4.2) under the project's CMP would not  
2 affect modeled habitat for curved-foot hygrotus diving beetle because these activities are outside of  
3 the known range of the species.

4 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
5 enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in the temporary  
6 disturbance of existing habitat and the potential for injury or mortality of curved-foot hygrotus  
7 diving beetle if they are within the range of the species and could ultimately provide benefits for the  
8 species. Site-specific analyses are not provided because locations of potential non-bank sites are not  
9 currently known.

10 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
11 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
12 management of agricultural areas but may also include natural communities in the study area  
13 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
14 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
15 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
16 CMP-22b: *Tricolored Blackbird Foraging Habitat*). Habitat for curved-foot hygrotus diving beetle  
17 would not be targeted for these specific site protection instruments so there would not likely be any  
18 effects on them. Site-specific analyses are not provided because locations of potential protection  
19 instruments are not currently known.

20 The impact on curved-foot hygrotus diving beetle from the project alternatives with the CMP would  
21 be less than significant with mitigation.

#### 22 Other Mitigation Measures

23 Some mitigation measures would involve ground disturbance that would have the potential to result  
24 in loss of modeled curved-foot hygrotus diving beetle habitat or result in injury, mortality, and  
25 disruption of normal behaviors of curved-foot hygrotus diving beetle if individuals are occupying  
26 affected habitat when it is dewatered for grading and excavation, or through exposure to  
27 construction-related fluids, such as fuels, oils, and cement. Impacts on curved-foot hygrotus diving  
28 beetle resulting from mitigation measures would be similar to construction effects of the project  
29 alternatives in certain construction areas and would contribute to curved-foot hygrotus diving  
30 beetle impacts of the project alternatives.

31 However, the impacts of habitat loss, ground disturbance, and exposure to hazardous materials on  
32 curved-foot hygrotus diving beetle would be reduced through the CMP; Environmental  
33 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
34 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
35 *Countermeasure Plans*; EC-14: *Construction Best Management Practices for Biological Resources*, and  
36 Mitigation BIO-14: *Avoid and Minimize Impacts on Vernal Pool Aquatic Invertebrates and Critical*  
37 *Habitat for Vernal Pool Fairy Shrimp*. Therefore, impacts on curved-foot hygrotus diving beetle from  
38 implementation of other mitigation measures would be reduced to less than significant.

39 Overall, the impacts on curved-foot hygrotus diving beetle from construction of compensatory  
40 mitigation and implementation of other mitigation measures, combined with project alternatives,  
41 would not change the impact conclusion of less than significant with mitigation.

## 1 **Impact BIO-21: Impacts of the Project on Crotch and Western Bumble Bees**

2 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
 3 information on the species life histories and habitat suitability models for Crotch and western  
 4 bumble bees are presented in the following species accounts in Appendix 13B: Section 13B.45,  
 5 *Crotch Bumble Bee*, and Section 13B.46, *Western Bumble Bee*.

### 6 ***All Project Alternatives***

#### 7 **Construction**

8 The construction of all the project alternatives would result in the permanent and temporary loss of  
 9 Crotch and western bumble bee modeled habitat primarily as a result of the levee improvement  
 10 work, new roads and road improvements, South Delta Outlet and Control Structure (Alternatives 1,  
 11 2a, 2b, 2c, 3, 4a, 4b, and 4c), and the Bethany Complex (Alternative 5) (Appendix 13C). The central  
 12 alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would result in greater impacts on modeled  
 13 habitat compared to the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and the  
 14 Bethany Reservoir alignment (Alternative 5) largely because of the levee improvements on Bouldin  
 15 Island and road improvements throughout the central alignment (Table 13-57). Environmental  
 16 Commitments EC-14: *Construction Best Management Practices for Biological Resources* would ensure  
 17 that temporarily disturbed areas are restored (Appendix 3B).

18 **Table 13-57. Impacts on Modeled Habitat for Crotch and Western Bumble Bees by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	377.75	97.23	474.98
2a	445.03	110.71	555.74
2b	355.14	106.94	462.08
2c	365.15	109.13	474.28
3	133.70	70.43	204.13
4a	213.52	72.00	285.52
4b	123.65	68.24	191.89
4c	133.64	70.43	204.07
5	92.64	45.22	137.86

19 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 20 discussion in Section 13.3.1.2.

21 Construction activities for all project alternatives could result in the injury, mortality, and disruption  
 22 of normal behaviors of Crotch and western bumble bees. These effects could result from project  
 23 grading, excavation, the use of construction-related vehicles, and exposure of bumble bees to  
 24 construction-related fluids, such as fuels, oils, and cement. Environmental Commitments EC-1:  
 25 *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management*  
 26 *Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and  
 27 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would  
 28 reduce these potential impacts by (1) training construction staff on protecting sensitive biological  
 29 resources, reporting requirements, and the ramifications for not following these measures; (2)  
 30 implementing spill prevention and containment plans that would avoid material spills that could  
 31 affect bees and their habitat; and (3) having a biological monitor present to ensure that non-

1 disturbance buffers and associated construction fencing are intact and all other protective measures  
2 are being implemented, where applicable.

3 One CNDDDB occurrence for western bumble bee (#211) overlaps with the overhead SCADA line that  
4 originates out of Brentwood for Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c (California Department of  
5 Fish and Wildlife 2020a). This occurrence is from 1940 and was reported to be generally in the  
6 vicinity of Brentwood (California Department of Fish and Wildlife 2020a). The location of this  
7 occurrence and where the SCADA line would be installed is entirely developed and the line would be  
8 attached to existing poles.

9 There are no CNDDDB occurrences of Crotch bumble bee overlapping the footprints for any of the  
10 project alternatives and the nearest is approximately 5 miles southeast of Alternatives 1, 2a, 2b, 2c,  
11 3, 4a, 4b, and 4c, and 6.5 miles southeast of Alternative 5 (California Department of Fish and Wildlife  
12 2020a).

13 Field investigations for all project alternatives would be conducted prior to and during construction  
14 to more specifically identify appropriate construction methods and design criteria addressed in the  
15 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
16 and address the establishment of geological and groundwater monitoring programs (Delta  
17 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations involve a variety  
18 of ground-disturbing activities that would vary in duration from several hours to approximately 6  
19 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and Construction Authority  
20 2022a, 2022b) and could result in impacts on habitat and the potential for injury, mortality, and the  
21 disruption of normal behaviors of Crotch and western bumble bee. Geotechnical investigations that  
22 would occur in the West Tracy Fault Study area and over the tunnel alignment footprints, which  
23 include test trenches, CPTs, soil borings, and geophysical arrays, would result in temporary impacts  
24 on habitat (Appendix 13C). The Bethany Fault Study geotechnical investigations (Alternative 5)  
25 would be completed in a single day and would involve placing approximately 20 ERT probes 0.5  
26 inch in diameter. The study would be conducted entirely on foot, perpendicular to the tunneled  
27 portion of the Bethany Reservoir Aqueduct (Delta Conveyance Design and Construction Authority  
28 2022a, 2022b). The Bethany Fault Study could result in minor disruption of normal behaviors, but  
29 because of its small footprint and the short (1 day) duration of the disturbance, impacts on modeled  
30 habitat are not quantified and are considered negligible. The following field investigations would be  
31 conducted within proposed surface construction footprints of project facilities (including portions of  
32 tunnel alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT,  
33 groundwater testing and monitoring, monument installation, pilot studies for settlement, agronomic  
34 testing, and utility potholing. These temporary impacts are not characterized as an additional loss of  
35 habitat because impacts for these locations have already been quantified within the construction  
36 footprints but could still result in the potential for injury, mortality, and the disruption of normal  
37 behaviors of Crotch and western bumble bee, as discussed above for conveyance facility  
38 construction. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2:  
39 *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
40 *Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
41 *Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1)  
42 training construction staff on protecting sensitive biological resources, reporting requirements, and  
43 the ramifications for not following these measures; (2) implementing spill prevention and  
44 containment plans that would avoid material spills that could affect bees and their habitat; and (3)  
45 having a biological monitor present to ensure that non-disturbance buffers and associated



1 construction fencing are intact and all other protective measures are being implemented, where  
2 applicable.

### 3 Operations

4 None of the project alternatives would result in operational impacts on Crotch and western bumble  
5 bee or their habitat because operating conveyance facilities would not involve disturbance or  
6 removal of habitat or effects on the species.

### 7 Maintenance

8 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
9 in impacts on Crotch and western bumble bee. Maintenance activities across all facilities that could  
10 affect bumble bees include repaving of access roads every 15 years and semiannual general and  
11 ground maintenance (e.g., mowing, vegetation trimming, herbicide application) could affect bumble  
12 bees and foraging habitat (flowers) that occur adjacent to facilities (e.g., herbicide drift, damage to  
13 flowers) and could result in the injury, mortality, and disruption of normal behaviors of Crotch and  
14 western bumble bee, especially if during their active season (February–November).

### 15 **CEQA Conclusion—All Project Alternatives**

16 The construction and maintenance of all project alternatives would result in impacts on Crotch and  
17 western bumble bee through the permanent and temporary loss of modeled habitat and the  
18 potential for injury, mortality, and the disruption of normal behaviors.

19 The temporary loss of habitat and the potential impacts of injury, mortality, and the disruption of  
20 normal behaviors Crotch and western bumble bees from project construction activities would be  
21 reduced by Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop  
22 and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill  
23 Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management  
24 Practices for Biological Resources* (Appendix 3B). Even with these commitments, however, the  
25 permanent loss of habitat from the construction of the project alternatives and the potential for  
26 injury, mortality, and disruption of normal behaviors from construction and maintenance on Crotch  
27 and western bumble would be significant. Implementation of the CMP would offset the loss of  
28 modeled habitat by creating and protecting grasslands on Bouldin Island that would be planted with  
29 species suitable as foraging habitat for Crotch and western bumble bee, and the creation and  
30 enhancement of seasonal wetlands on Bouldin Island would likely support flowering plants along  
31 their margins during the spring and the deeper portions during the summer as they dry down  
32 (Appendix 3F, Sections 3F.3.2.3, 3F.3.3.2, and 3F.4.1.3.4). The compensatory mitigation for vernal  
33 pool fairy shrimp and vernal pool tadpole shrimp (Appendix 3F, Section 3F.3.3.3, and Attachment  
34 3F.1, Table 3F.1-3, CMP-11: *Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp Habitat*) and  
35 protection of upland grasslands as part of California red-legged frog and California tiger salamander  
36 mitigation through the purchasing of conservation credits at a USFWS- and CDFW-approved  
37 conservation bank (Appendix 3B, Section 3F.3.3.3), could also support habitat for bumble bees.  
38 Mitigation Measures BIO-2b: *Avoid and Minimize Impacts on Terrestrial Biological Resources from  
39 Maintenance Activities*, and BIO-21: *Avoid and Minimize Impacts on Bumble Bees* would avoid and  
40 minimize the potential for injury, mortality, disruption of normal behaviors, and disturbances to  
41 habitat. The impacts on Crotch and western bumble bee from the project alternatives would be less  
42 than significant with mitigation because these aforementioned measures would replace lost habitat

1 and reduce direct effects on the species, including habitat disturbance, by identifying and avoiding  
2 potential habitat to the extent possible during maintenance and construction activities through  
3 establishing avoidance buffers, by temporarily delaying work where colonies are identified, and  
4 replanting areas of disturbed habitat with suitable foraging plants.

### 5 **Mitigation Measure CMP: Compensatory Mitigation Plan**

6 The CMP that DWR will implement (see Impact BIO-1 for a summary discussion of the CMP)  
7 would provide benefits to Crotch and western bumble bee habitat by creating and protecting  
8 grasslands on Bouldin Island that will be planted with species suitable as foraging habitat for  
9 Crotch and western bumble bee and the creation and enhancement of seasonal wetlands on  
10 Bouldin Island will likely support flowering plants along their margins during the spring and the  
11 deeper portions during the summer as they dry down (Appendix 3F, Sections 3F.3.2.3, 3F.3.3.2,  
12 and 3F.4.1.3.4). The protection of upland grasslands as part of vernal pool fairy shrimp, vernal  
13 pool tadpole shrimp, California red-legged frog and California tiger salamander mitigation  
14 through the purchasing of conservation credits at a USFWS- and CDFW-approved conservation  
15 bank (Appendix 3B, Section 3F.3.3.3), could also support habitat for bumble bees. Though these  
16 mitigation areas would be specifically targeting suitable habitat for vernal pool fairy shrimp,  
17 vernal pool tadpole shrimp, California red-legged frog, and California tiger salamander, they  
18 would occur within the range of Crotch and western bumble bee and would generally provide  
19 suitable habitat for the species.

### 20 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 21 **Resources from Maintenance Activities**

22 See description of Mitigation Measure BIO-2b under Impact BIO-2.

### 23 **Mitigation Measure BIO-21: Avoid and Minimize Impacts on Bumble Bees**

#### 24 ***All Project Alternatives***

25 As properties become accessible for initiating project and restoration activities, DWR will  
26 require site-level surveys to be conducted to verify the suitability of modeled habitat. Botanical  
27 surveys will be conducted by experienced botanists in spring/early summer to identify and map  
28 general concentrations of flowering plants that provide food resources (foraging habitat) for  
29 Crotch and western bumble bees. The foraging habitat evaluation surveys will be based on  
30 recommendations in the *Rusty Patched Bumble Bee Habitat Assessment Form and Guide* (The  
31 Xerces Society for Invertebrate Conservation 2017:3–12) or will follow specific guidance for  
32 Crotch and western bumble bees available at that time.

33 If moderate to high quality foraging habitat for Crotch and western bumble bee is identified in  
34 construction areas based on the habitat evaluation surveys and these areas will have initial  
35 ground disturbance occurring during the nesting season, these areas will be surveyed by  
36 qualified invertebrate biologist(s) (familiar with the behavior and life histories of Crotch and  
37 western bumble bee) within 1 year prior to the start of construction in a given area. Surveys will  
38 be conducted according to the methods in Thorp et al. (1983) or according to any future survey  
39 methodologies specifically for Crotch and western bumble bees. Surveys would be conducted  
40 during four evenly spaced sampling periods during the flight season for both Crotch and  
41 western bumble bees, which is generally between early February and late November (Thorp et  
42 al. 1983:18, California Department of Fish and Wildlife 2019b:30). For each sampling event, the

1 biologist(s) will survey suitable habitat using nonlethal netting methods for 1 person-hour per 3  
2 acres of the highest quality habitat or until Crotch or western bumble bees are sighted,  
3 whichever comes first. If initial sampling does not find Crotch or western bumble bees and if  
4 based on the opinion of a qualified biologist that the habitat is of low quality, no further  
5 sampling of that area will be required.

6 If Crotch and western bumble bees are determined to be absent from a given work area based  
7 on negative survey results, or a qualified invertebrate biologist (experienced with bumble bees)  
8 concludes that there is a very low likelihood that these species are present, then no additional  
9 mitigation is required.

10 If Crotch or western bumble bees are determined to be present in project work areas, then DWR  
11 will implement the following measures.

- 12 1. If bumble bee surveys identify occupied Crotch and/or western bumble bee habitat within  
13 construction areas, the qualified biologist will then conduct additional preconstruction  
14 surveys within the project disturbance footprint for active Crotch and western bumble bee  
15 nest colonies and associated floral resources (i.e., flowering vegetation on which bees from  
16 the colony are observed foraging) no more than 30 days prior to any ground disturbance  
17 between March and September. The purpose of this preconstruction survey is to identify  
18 active nest colonies and associated floral resources outside of permanent impact areas (e.g.,  
19 in staging or other temporary disturbance areas), that could be completely or temporarily  
20 avoided by construction personnel. A qualified biologist will establish, monitor, and  
21 maintain no-work buffers around Crotch and western bumble bee nest colonies and floral  
22 resources identified during surveys. The size and configuration of the no-work buffer will be  
23 based on best professional judgment of the biologist. At a minimum, the buffer will provide  
24 at least 20 feet of clearance around nest entrances. Construction activities will not occur  
25 within the no-work buffers until the colony is no longer active (i.e., no Crotch or western  
26 bumble bees are seen flying in or out of the nest for 3 consecutive days, indicating the  
27 colony has completed its nesting season and the next season's queens have dispersed from  
28 the colony). Monitoring of an active nest could be conducted using a motion-detecting  
29 wildlife trail camera or daily by a qualified biologist for a duration suitable for detecting  
30 nesting activity based on site-specific conditions, weather, and species behaviors.
- 31 2. To minimize temporary disturbance of suitable foraging and nesting habitat for Crotch and  
32 western bumble bees, ground disturbance within suitable habitat will be restricted to the  
33 minimum area necessary to perform construction activities.
- 34 3. Temporarily disturbed grasslands that are revegetated will use a seed mix combination that  
35 includes nectar- and pollen-producing plants commonly used as a food source by Crotch and  
36 western bumble bees. These plants will be incorporated into the seed mix, as applicable for  
37 the existing habitat conditions.

### 38 ***Mitigation Impacts***

39 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
40 mitigation measure impacts. The analyses below consider the potential impacts associated with  
41 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
42 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
43 *Measures*.

### 1 Compensatory Mitigation

2 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
3 species on Bouldin Island and the I-5 ponds under the project's CMP would affect modeled habitat  
4 for Crotch and western bumble bee (Appendix 13C) from vegetation removal and grading to create  
5 the appropriate topography and soil conditions to establish or restore habitats. The CMP could also  
6 affect bumble bees through tidal wetland habitat restoration and channel margin enhancement  
7 because potential areas identified generally overlap with modeled habitat (Appendix 3F, Section  
8 3F.4.3.4.2).

9 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
10 enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in the temporary  
11 disturbance of existing bumble bee habitat and the potential for injury or mortality of bumble bees  
12 but would ultimately provide benefits for these species. Site-specific analyses are not provided  
13 because locations of potential non-bank sites are not currently known.

14 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
15 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
16 management of agricultural areas but may also include natural communities in the study area  
17 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
18 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
19 *CMP-19b: Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
20 *CMP-22b: Tricolored Blackbird Foraging Habitat*). These areas could potentially contain grasslands  
21 suitable for bumble bees and management activities could affect this habitat and result in the  
22 disruption of normal behaviors, injury, and mortality. Site-specific analyses are not provided  
23 because locations of potential protection instruments are not currently known.

24 The CMP and site-specific permitting approvals would account for any losses of bumble bee habitat  
25 from restoration activities by adjusting the overall commitment of grassland creation and protection  
26 (Appendix 3F, Section 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General*  
27 *Design Guidelines*) and therefore reduce any habitat losses associated with the CMP to a less-than-  
28 significant level. These creation and enhancement activities would also have the potential for injury,  
29 mortality, and the disruption of normal behaviors of individuals. Environmental Commitments EC-1:  
30 *Conduct Worker Awareness Training*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
31 *Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
32 (Appendix 3B); and Mitigation Measure BIO-21: *Avoid and Minimize Impacts on Bumble Bees* would  
33 reduce these potential impacts to a less-than-significant level by (1) training construction staff on  
34 protecting sensitive biological resources, reporting requirements, and the ramifications for not  
35 following these measures; (2) implementing spill prevention and containment plans that would  
36 avoid material spills that could affect bees and their habitat; and (3) having a biological monitor  
37 present to ensure that non-disturbance buffers and associated construction fencing are intact and all  
38 other protective measures are being implemented, where applicable.

39 The impact on Crotch and western bumble bee from the project alternatives with the CMP would be  
40 less than significant with mitigation.

### 41 Other Mitigation Measures

42 Some mitigation measures would involve ground disturbance that would have the potential to result  
43 in loss of modeled Crotch and western bumble bee habitat or result in injury, mortality, and

1 disruption of normal behaviors of Crotch and western bumble bee from construction equipment  
2 conducting grading or excavation, or through exposure to construction-related fluids, such as fuels,  
3 oils, and cement. Impacts on Crotch and western bumble bee resulting from implementation of  
4 mitigation measures would be similar to construction effects of the project alternatives in certain  
5 construction areas and would contribute to Crotch and western bumble bee impacts of the project  
6 alternatives.

7 However, the impacts of habitat loss, ground disturbance, and exposure to dust or hazardous  
8 materials on Crotch and western bumble bee would be reduced through the CMP; Environmental  
9 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
10 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
11 *Countermeasure Plans*; EC-11: *Fugitive Dust Control*; EC-14: *Construction Best Management Practices*  
12 *for Biological Resources*; and Mitigation Measure BIO-21: *Avoid and Minimize Impacts on Bumble*  
13 *Bees*. Therefore, impacts on Crotch and western bumble bee from implementation of other  
14 mitigation measures would be reduced to less than significant.

15 Overall, the impacts on Crotch and western bumble bee from construction of compensatory  
16 mitigation and implementation of other mitigation measures, combined with project alternatives,  
17 would not change the impact conclusion of less than significant with mitigation.

## 18 **Impact BIO-22: Impacts of the Project on California Tiger Salamander**

19 The methods for the analysis of effects on California tiger salamander appear in Section 13.3.1.1 and  
20 information on the species life history and habitat suitability model are presented in the species  
21 account in Appendix 13B, Section 13B.47, *California Tiger Salamander*.

### 22 ***All Project Alternatives***

#### 23 ***Construction***

24 The construction of the central and eastern alignment alternatives (Alternatives 1, 2a, 2b, 2c, 3, 4a,  
25 4b, and 4c), would result in the permanent and temporary loss of California tiger salamander  
26 modeled habitat, including potential indirect effects on habitat. These impacts would occur  
27 primarily as a result of the construction of new roads and a temporary railroad near Clifton Court  
28 Forebay (permanent and temporary upland impacts) and the construction of the South Delta Outlet  
29 and Control Structure (permanent and temporary upland impacts). Construction-related grading  
30 and excavation would result in the permanent and temporary loss of California tiger salamander  
31 upland habitat (Table 13-58). Environmental Commitment EC-14: *Construction Best Management*  
32 *Practices for Special-Status Species* would ensure that temporarily disturbed areas are restored  
33 (Appendix 3B). The South Delta Outlet and Control Structure (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and  
34 4c) would be built within less than 50 feet of modeled aquatic habitat that occurs to the west (Figure  
35 13B.47-1), which could result in a permanent change to the hydrology of this aquatic habitat from a  
36 reduction in the size of the supporting watershed and the potential to alter the subsurface  
37 hydrology, subsequently reducing the habitat's ability to support California tiger salamander  
38 breeding. For Alternatives 2a and 4a, a temporary work area associated with the South Delta Outlet  
39 and Control Structure would be approximately 125 feet south of modeled aquatic habitat (Figure

1 13B.47-1) that is known to be occupied by the California tiger salamander (occurrence #965,<sup>1</sup>  
 2 California Department of Fish and Wildlife 2020a). Depending on the site-specific topography and  
 3 subsurface hydrology, this temporary work area could temporarily or permanently alter the  
 4 hydrology of this habitat. Alternatives 2a and 4a would also result in additional impacts on modeled  
 5 upland habitat on the banks of the Delta-Mendota Canal through the construction of the Jones Outlet  
 6 Structure.

7 **Table 13-58. Impacts on Modeled Habitat for California Tiger Salamander by Alternative**

Alternative	Permanent Impacts—Aquatic (acres) <sup>a</sup>	Permanent Impacts—Upland (acres) <sup>a</sup>	Temporary Impacts—Aquatic (acres)	Temporary Impacts—Upland (acres)	Total (acres)
1, 2b, 2c, 3, 4b, 4c	0.00	94.37	0.00	20.89	115.26
2a, 4a	0.00	143.89	0.00	22.40	166.29
5	0.20	59.58	0.00	18.43	78.21

8 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 9 discussion in Section 13.3.1.2.

10 The new intersection for Byron Highway and the extension of Armstrong Road for central and  
 11 eastern alignment project alternatives (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c), would create  
 12 additional barriers to California tiger salamander potentially dispersing from modeled upland  
 13 habitat to the east to breeding habitat to the west. Roads servicing the proposed Southern Forebay  
 14 would also create barriers to movement and fragment modeled upland habitat.

15 The construction of Alternative 5 would also result in the permanent and temporary loss of  
 16 California tiger salamander modeled habitat, including potential indirect effects on habitat as result  
 17 of grading and excavation. These impacts would occur as a result of the improvements to Kelso Road  
 18 to access the Bethany Reservoir Pumping Plant (permanent and temporary upland impacts), the  
 19 construction of the Bethany Reservoir Aqueduct and an associated access road off of Kelso Road  
 20 (permanent and temporary upland and aquatic impacts, indirect aquatic), and construction of the  
 21 Bethany Reservoir Discharge Structure and associated access road (permanent and temporary  
 22 upland impacts). The construction of the Bethany Reservoir Aqueduct would affect a portion of a  
 23 linear vernal pool that appears to feed into a large pool further downslope and would be within 30  
 24 feet of another pool (Figure 13B.47-1), all of which are modeled as aquatic habitat for California  
 25 tiger salamander. Constructing these facilities could result in a permanent change to the hydrology  
 26 of this aquatic habitat from a reduction in the size of the supporting watershed and the potential to  
 27 alter the subsurface hydrology, subsequently reducing the habitat's ability to support California  
 28 tiger salamander breeding.

29 Alternative 5 would also fragment California tiger salamander upland habitat and create barriers to  
 30 movement with the widening of Mountain House Road, the construction of the Bethany Reservoir  
 31 Aqueduct, and construction of the new access road to Bethany Reservoir.

<sup>1</sup> The version of the CNDDDB that is cited here, and in the rest of Chapter 13, is from 2020; however, since that time CDFW has split and renumbered the occurrences for California tiger salamander between the three populations. The occurrence numbers referenced in this section (Impact BIO-22: *Impacts of the Project on California Tiger Salamander*) have been updated to reflect those changes as of April 1, 2022 for the central California population of California tiger salamander.

1 Construction activities associated with the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b,  
2 and 4c) and Bethany Complex (Alternative 5) for all project alternatives could result in the injury  
3 and/or mortality of California tiger salamander if they are moving on the surface or occupying small  
4 mammal burrows or soil crevices during activities such as grading, excavation, soil compaction, and  
5 the use of construction-related vehicles. California tiger salamander could also be trapped in open  
6 trenches or other excavations and become vulnerable to desiccation and predation. Construction  
7 activities could also result in the exposure of California tiger salamander to construction-related  
8 fluids, such as fuels, oils, and cement, which could result in the injury and/or mortality of eggs,  
9 larvae, and adults. Construction lighting during night work could disrupt normal behaviors of  
10 California tiger salamander if lighting spills over into adjacent habitats, potentially resulting in  
11 delayed dispersal movements and subjecting salamanders to increased predation risk; however, as  
12 stated in Chapter 3, Section 3.4.12, *Fencing and Lighting*, construction lighting would be downcast,  
13 cut-off type fixtures with non-glare finishes, which would reduce the potential for this impact.  
14 Construction noise and vibration could also disrupt normal behaviors and result in increased energy  
15 expenditures, predation risk, and potential for injury or mortality from nearby construction if these  
16 activities result in individuals leaving underground cover. The use of tunnel boring machines during  
17 construction would potentially cause groundborne vibration in the immediate vicinity of tunnel  
18 construction areas. However, because of the depth at which the tunnel would be constructed, and  
19 because the deep soil cover over the tunnel would effectively dampen and absorb propagated  
20 energy from the tunnel crown and the tunnel floor, no significant noise and vibration effects from  
21 the operation of the tunnel boring machine on California tiger salamander are anticipated (Chapter  
22 24, *Noise and Vibration*, Section 24.4.3.2, *Impacts of the Project Alternatives Related to Noise and*  
23 *Vibration*). Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop*  
24 *and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
25 *Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
26 *Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1)  
27 training construction staff on protecting sensitive biological resources, reporting requirements, and  
28 the ramifications for not following these measures; (2) implementing spill prevention and  
29 containment plans that would avoid material spills that could affect the viability of nearby aquatic  
30 and upland habitat; (3) having a biological monitor present to ensure that non-disturbance buffers  
31 and associated construction fencing are intact and all other protective measures are being  
32 implemented, where applicable; and (4) limiting construction vehicle traffic to a maximum speed  
33 limit of 15 miles per hour on unpaved, non-public construction access roads and nighttime speed  
34 limits to 10 miles per hour on these roads when they are adjacent to suitable habitat for California  
35 tiger salamander.

36 One CNDDDB occurrence for California tiger salamander falls within the Southern Complex new road  
37 right-of-way at Byron Highway and North Bruns Road and the temporary railroad right-of-way  
38 (California Department of Fish and Wildlife 2020a). This record (#152) is from 1982 and is  
39 described as a farm pond surrounded by grassland in the vicinity of the junction of Byron Highway  
40 and North Bruns Road (California Department of Fish and Wildlife 2020a). No modeled aquatic  
41 habitat or aquatic habitat visible in a review of aerial photos (Maxar 2020) or grassland occurs  
42 within this CNDDDB polygon. A pond surrounded by grassland approximately 0.25 mile southwest of  
43 this occurrence has a CNDDDB record that was recorded (#965) in 2011. The habitat identified in  
44 CNDDDB occurrence #152 has either since been removed or the location was incorrectly mapped. No  
45 other CNDDDB occurrences would be affected by the project alternatives.

1 Field investigations for all project alternatives would be conducted prior to and during construction  
2 to more specifically identify appropriate construction methods and design criteria addressed in the  
3 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
4 and address the establishment of geological and groundwater monitoring programs (Delta  
5 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
6 variety of ground-disturbing activities that would vary in duration from several hours to  
7 approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
8 Construction Authority 2022a, 2022b) and could result in impacts on habitat and the potential for  
9 injury, mortality, and the disruption of normal behaviors of California tiger  
10 salamander. Geotechnical investigations that would occur in the West Tracy Fault Study area, the  
11 tunnels linking the Southern Forebay to the South Delta Outlet and Control Structure (Alternatives  
12 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c), and the tunnel for the Bethany Reservoir Aqueduct (Alternative 5),  
13 which include test trenches, CPTs, soil borings, and geophysical arrays, would result in temporary  
14 impacts on California tiger salamander habitat (Appendix 13C). The geotechnical investigations over  
15 the conveyance tunnels linking the intakes to the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a,  
16 4b, and 4) and to the Bethany Complex (Alternative 5) would not take place in modeled California  
17 tiger salamander habitat. The Bethany Fault Study geotechnical investigations (Alternative 5) would  
18 be completed in a single day and would involve placing approximately 20 ERT probes 0.5 inch in  
19 diameter. The study would be conducted entirely on foot, perpendicular to the tunneled portion of  
20 the Bethany Reservoir Aqueduct (Delta Conveyance Design and Construction Authority 2022a,  
21 2022b). The Bethany Fault Study could result in minor disruption of normal behaviors, but because  
22 of its small footprint and the short (1 day) duration of the disturbance, impacts on modeled habitat  
23 are not quantified and are considered negligible. The following field investigations would be  
24 conducted within proposed surface construction footprints of project facilities (including portions of  
25 tunnel alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT,  
26 groundwater testing and monitoring, monument installation, pilot studies for settlement, agronomic  
27 testing, and utility potholing. These temporary impacts are not characterized as an additional loss of  
28 habitat because impacts for these locations have already been quantified within the construction  
29 footprints but could still result in the potential for injury, mortality, and the disruption of normal  
30 behaviors of California tiger salamander, as discussed above for conveyance facility construction.  
31 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
32 *Implement Hazardous Materials Management Plans*, EC-3: *Develop and Implement Spill Prevention,*  
33 *Containment, and Countermeasure Plans*, and EC-14: *Construction Best Management Practices for*  
34 *Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training  
35 construction staff on protecting sensitive biological resources, reporting requirements, and the  
36 ramifications for not following these measures; (2) implementing spill prevention and containment  
37 plans that would avoid material spills that could affect the viability of nearby aquatic and upland  
38 habitat; and (3) having a biological monitor present to ensure that non-disturbance buffers and  
39 associated construction fencing are intact and all other protective measures are being implemented,  
40 where applicable.

#### 41 Operations

42 All project alternatives have the potential for impacts on California tiger salamander from  
43 operations at project facilities occurring adjacent to modeled habitat, which includes impacts  
44 associated with vehicle traffic on access roads and permanent project lighting. California tiger  
45 salamanders could be struck by vehicle traffic during the rainy season (November–April), in  
46 particular on rainy nights, on access roads to the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a,



1 4b, and 4c) and the Bethany Complex (Alternative 5). Lighting at facilities associated with the  
2 Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and the Bethany Complex  
3 (Alternative 5) could disrupt normal behaviors of California tiger salamander if lighting at these  
4 facilities spills over into adjacent habitats, potentially resulting in delayed dispersal movements and  
5 subjecting salamanders to increased predation risk. As stated in Chapter 3, Section 3.4.12, *Fencing*  
6 *and Lighting*, permanent lighting at Bethany Reservoir Pumping Plant and Surge Basin, and  
7 discharge structure would be motion activated, downcast, cut-off type fixtures with non-glare  
8 finishes, which would minimize the potential for this impact. The analysis in Chapter 18, *Aesthetics*  
9 *and Visual Resources*, Impact AES-4: *Create New Sources of Substantial Light That Would Adversely*  
10 *Affect Day or Nighttime Views of the Construction Areas or Permanent Facilities* shows that with the  
11 project designs the lighting would be shielded and oriented in such a manner so as not to subject the  
12 immediate surroundings to extremes in levels of light.

### 13 Maintenance

14 The maintenance of the Southern Complex on Byron Tract and west of Byron Highway (Alternatives  
15 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and the Bethany Complex (Alternative 5) could result in impacts on  
16 California tiger salamander.

17 Maintenance at the Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) would include  
18 repaving of access roads every 15 years, annual embankment repair, quarterly animal burrow  
19 filling, quarterly weed management (e.g., mechanical removal and herbicide application), and  
20 semiannual general and ground maintenance (e.g., mowing, vegetation trimming), and daily or  
21 weekly inspections by vehicle, and could result in the injury and/or mortality of California tiger  
22 salamanders occupying burrows and/or dispersing through these areas during these activities. The  
23 likelihood of this occurring is low because the Southern Forebay would be constructed in an area  
24 that currently does not provide suitable habitat for California tiger salamander, as the nearest  
25 modeled aquatic habitat is approximately 1 mile west of the footprint of the proposed forebay, and  
26 the ongoing maintenance would likely make it unsuitable for California tiger salamander.

27 Maintenance activities at the South Delta Outlet and Control Structure (Alternatives 1, 2a, 2b, 2c, 3,  
28 4a, 4b, and 4c), which would include annual cleaning (pressure washing), semiannual general and  
29 ground maintenance (e.g., mowing, vegetation trimming, herbicide application), and daily or weekly  
30 inspections by vehicle, could result in the injury or mortality of California tiger salamanders. These  
31 impacts would occur if California tiger salamanders are occupying burrows in areas where  
32 vegetation management takes place, if they are dispersing through these areas, or if chemicals used  
33 during these activities reach aquatic habitat through spills or from storm runoff. There is modeled  
34 aquatic habitat within 50 feet of the facility and occupied habitat that is located approximately 550  
35 feet west of the facility (occurrence #965, California Department of Fish and Wildlife 2020a).

36 Maintenance activities at the Bethany Complex (Alternative 5), which would include repaving of  
37 access roads every 15 years, semiannual general and ground maintenance (e.g., mowing, vegetation  
38 trimming, herbicide application), and daily or weekly inspections by vehicle, could result in the  
39 injury or mortality of California tiger salamanders. These impacts would occur if California tiger  
40 salamanders are occupying burrows in areas where vegetation management takes place or if they  
41 are dispersing through these areas.

## 1 **CEQA Conclusion—All Project Alternatives**

2 Construction, operations, and maintenance of all project alternatives would result in impacts on  
3 California tiger salamander through the permanent and temporary loss of modeled habitat, habitat  
4 fragmentation, and the potential for injury, mortality, and the disruption of normal behaviors.

5 The temporary loss of habitat and the potential impacts of injury, mortality, and the disruption of  
6 normal behaviors of larvae and adults from project construction would be reduced by  
7 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
8 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
9 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
10 *Biological Resources* (Appendix 3B). Even with these commitments, however, the permanent loss of  
11 habitat from the construction of the alternatives and the potential for injury, mortality, and  
12 disruption of normal behaviors from construction, operations, and maintenance on California tiger  
13 salamander would be significant. Implementation of the CMP would offset the loss of California tiger  
14 salamander habitat through the purchase of conservation credits at a USFWS- and CDFW-approved  
15 mitigation bank (Appendix 3F, Sections 3F.3.3.3 and 3F.4.2.1.2 and Attachment 3F.1, Table 3F.1-3,  
16 CMP-13: *California Tiger Salamander Habitat*), which would reduce the impact associated with  
17 habitat loss to a less-than-significant level. Mitigation Measures AES-4b: *Minimize Fugitive Light*  
18 *from Portable Sources Used for Construction* (Chapter 18), BIO-2b: *Avoid and Minimize Impacts on*  
19 *Terrestrial Biological Resources from Maintenance Activities*, BIO-22a: *Avoid and Minimize Impacts on*  
20 *California Tiger Salamander*, and BIO-22b: *Avoid and Minimize Operational Traffic Impacts on*  
21 *Wildlife* would be required to avoid and minimize the potential for injury, mortality, disruption of  
22 normal behaviors, and disturbances to habitat. The impacts on California tiger salamander from the  
23 project alternatives would be less than significant with mitigation because these aforementioned  
24 measures would replace lost habitat and reduce direct effects on the species, including habitat  
25 disturbance, by designing lighting that avoids spillover into habitats and thus avoiding disrupting  
26 dispersal movements; by avoiding construction and maintenance activities in and adjacent to  
27 habitat to the extent possible; timing construction activities, installing exclusion fencing, conducting  
28 preconstruction surveys, and other protective measures to avoid and minimize the potential for  
29 injury and mortality; and by putting in place traffic control measures at DWR facilities during  
30 operations to minimize the potential for vehicle strikes.

## 31 **Mitigation Measure CMP: Compensatory Mitigation Plan**

32 DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to  
33 offset the loss of California tiger salamander habitat by purchasing conservation credits at a  
34 USFWS- and CDFW-approved mitigation bank or through other site protection instruments  
35 (Appendix 3F, Sections 3F.3.3.3 and 3F.4.2.1.2 and Attachment 3F.1, Table 3F.1-3, CMP-13:  
36 *California Tiger Salamander Habitat*). Mitigation sites would be prioritized for the  
37 Concord/Livermore Recovery Unit, which is identified in USFWS's 2017 *Recovery Plan for the*  
38 *Central California Distinct Population Segment of the California Tiger Salamander (Ambystoma*  
39 *californiense)* (U S. Fish and Wildlife Service 2017b:II-3).

## 40 **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for** 41 **Construction**

42 See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

1       **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
2       **Resources from Maintenance Activities**

3       See description of Mitigation Measure BIO-2b under Impact BIO-2.

4       **Mitigation Measure BIO-22a: Avoid and Minimize Impacts on California Tiger Salamander**

5       ***All Project Alternatives***

6       The following measures for California tiger salamander will only be required for construction  
7       activities occurring within suitable habitat as identified from the habitat modeling and by  
8       additional assessments conducted during the planning for work in a given area.

9       During project implementation and prior to project construction, DWR will implement the  
10      following measures.

- 11      1. When each site is available for surveys a USFWS- and CDFW- approved biologist will then  
12      delineate California tiger salamander habitat at each project site, based on the definition of  
13      suitable habitat, including both aquatic and upland habitat. The criteria used for assessing  
14      suitable habitat have been adopted from the primary constituent elements identified in the  
15      2005 critical habitat designation for the Central Valley distinct population segment of  
16      California tiger salamander (70 FR 49390). Habitat deemed suitable will include at least one  
17      of the following:
- 18          a. Aquatic—Standing bodies of fresh water (including natural and human-made [e.g.,  
19          stock]) ponds, vernal pools, and other ephemeral or permanent waterbodies that  
20          typically support inundation during winter rains and hold water for a minimum of 12  
21          weeks in a year of average rainfall.
- 22          b. Upland—Upland habitats within 1.3 miles of suitable aquatic habitat that contain small  
23          mammal burrows or other underground habitat that California tiger salamander depend  
24          upon for food, shelter, and protection from the elements and predation. Accessible  
25          upland dispersal habitat between occupied locations that allow for movement between  
26          such sites.
- 27      2. Once habitat has been delineated, the USFWS- and CDFW-approved biologist may use  
28      surveys performed using a method approved by USFWS and CDFW to determine presence of  
29      the species on the project site to enable further determination of compensatory mitigation  
30      requirements. In the event of a dry year, the aquatic habitat will be evaluated based on  
31      general suitability (e.g., evidence of suitable ponding depths, proximity to occurrences) and  
32      the habitat will be assumed to represent occupied habitat.
- 33      3. To the greatest extent possible, identified and delineated habitat will be completely avoided.

34      For areas verified as being suitable for California tiger salamander and that can't be avoided, the  
35      following measures will be implemented.

- 36      4. To the extent practicable, initial ground-disturbing activities will not be conducted between  
37      November 1 and March 31, or extended to April 30 during wet years, in areas identified  
38      during the planning stages as providing suitable California tiger salamander habitat, to  
39      avoid the period when they are most likely to be moving through upland areas. Once the  
40      area has been surveyed, initial ground disturbance has occurred, and exclusionary fencing is  
41      in place, work within the disturbed area can occur outside the construction window.

- 1           5. Where construction takes place in aquatic habitat, activities will not be initiated until after  
2 the habitat is no longer ponding water or until a USFWS- and CDFW-approved biologist has  
3 surveyed the aquatic habitat for presence of California tiger salamander and results have  
4 been submitted to the agencies. No work or dewatering will be allowed in occupied habitat.  
5 If a work site is to be temporarily dewatered by pumping, intakes will be completely  
6 screened with wire mesh not larger than 5 millimeters to prevent larger aquatic species  
7 from entering the pump system.
- 8           6. Ground-disturbing activities will be designed to minimize or eliminate effects on rodent  
9 burrows that may provide suitable cover habitat for California tiger salamander. Surface-  
10 disturbing activities will avoid areas with a high concentration of burrows to the greatest  
11 extent practicable. In addition, when a concentration of burrows is present in a work site,  
12 the area plus a 50-foot buffer will be staked or flagged to ensure that work crews are aware  
13 of their location and to facilitate avoidance of the area.
- 14          7. All initial ground disturbance or vegetation removal (clearing) will be limited to periods of  
15 no or low rainfall (less than 0.08 inch per 24-hour period and less than 40% chance of rain).  
16 To the extent practicable, clearing activities within California tiger salamander habitat will  
17 cease 24 hours prior to a 40% or greater forecast of rain from the closest National Weather  
18 Service (NWS) weather station. Clearing may continue 24 hours after the rain ceases, if no  
19 more than 0.5 inch of precipitation is in the 72-hour forecast. If clearing must continue when  
20 rain is forecast (greater than 40% chance of rain), a USFWS- and CDFW-approved biologist  
21 will survey the work site before clearing begins each day rain is forecast. If rain exceeds 0.5  
22 inch during a 24-hour period, clearing will cease until the NWS forecasts no further rain.  
23 Modifications to this timing may be pursued in coordination with the agencies based on site  
24 conditions and expected risks to California tiger salamander. For a given site that has  
25 exclusion fencing in place and all surface soil disturbance completed (i.e., no burrows  
26 present), these restrictions would no longer apply.
- 27          8. To the extent practicable, earthmoving and construction activities will cease no less than 30  
28 minutes before sunset and will not begin again until no less than 30 minutes after sunrise  
29 within 300 feet of California tiger salamander habitat. Except when necessary for driver or  
30 pedestrian safety, to the greatest extent practicable, artificial lighting at a work site will be  
31 prohibited during the hours of darkness.
- 32          9. At least 15 days prior to any ground-disturbing activities, DWR will prepare and submit a  
33 relocation plan for USFWS's and CDFW's written approval. The relocation plan will contain  
34 the name(s) of the USFWS- and CDFW-approved biologist(s) to relocate California tiger  
35 salamanders, the method of relocation (if different than described), a map, and a description  
36 of the proposed release site(s) within 300 feet of the work area or at a distance otherwise  
37 agreed to by USFWS and CDFW, and written permission from the landowner to use their  
38 land as a relocation site. The relocation plan will also include methods for searching for  
39 California tiger salamander in the work areas to avoid and minimize the potential for injury  
40 and mortality. Generally, work areas will be attempted to be cleared of California tiger  
41 salamanders by placing pit fall traps along the inside of the exclusion fence (i.e., within work  
42 areas) or by hand-excavating mammal burrows. Methods will be selected based on site  
43 specific conditions in a given work area and will be approved by USFWS and CDFW. Any  
44 California tiger salamanders found will be relocated according to the agency-approved  
45 relocation plan and will following the handling protocols outlined below.

- 1           10. The perimeter of construction sites within or adjacent to California tiger salamander habitat  
2           will be fenced with fencing material suitable for excluding amphibians by no more than 14  
3           days prior to the start of construction activities (e.g., staging, vegetation removal, grading) in  
4           a given area. The construction manager and the USFWS- and CDFW-approved biologist will  
5           determine where exclusion fencing will be installed to protect California tiger salamander  
6           habitat adjacent to the defined site footprint and to minimize the potential for California  
7           tiger salamanders to enter the construction work area. The placement of exclusion fencing  
8           will be determined, in part, by the locations of suitable habitat for the species (defined  
9           above). A conceptual fencing plan will be submitted to USFWS and CDFW prior to the start  
10          of construction and the exclusion fencing will be shown on the final construction plans. DWR  
11          will include the amphibian exclusion fence specifications including installation and  
12          maintenance criteria in the bid solicitation package special provisions. The amphibian  
13          exclusion fencing will remain in place for the duration of construction and will be regularly  
14          inspected and fully maintained. The biological monitor and construction manager will be  
15          responsible for checking the exclusion fencing around the work areas each day of  
16          construction for wildlife trapped inside and to ensure that they are intact and upright. This  
17          will be especially critical during times of inclement weather that could damage the fencing.  
18          Repairs to the amphibian exclusion fence will be made within 24 hours of discovery of a  
19          breach. Where construction access is necessary, gates will be installed in the exclusion fence  
20          and fencing will be installed to direct animals away from the work area to the extent  
21          practicable (e.g., fencing will flare out and turn back toward suitable habitat).
- 22          11. Preconstruction surveys will be conducted by a USFWS- and CDFW-approved biologist  
23          immediately prior to the initiation of any ground-disturbing activities or vegetation clearing,  
24          including immediately prior to exclusion fence installation, in areas identified as having  
25          suitable California tiger salamander habitat. These surveys will consist of walking surveys  
26          within the work sites and investigating suitable aquatic and upland habitat including  
27          potential refugia habitat such as small woody debris, refuse, burrow entrances, etc., that are  
28          not directly disturbed by project activities. If there is a lapse in construction in a work area  
29          for 7 days or more, these surveys will be repeated before activities resume.
- 30          12. The USFWS- and CDFW-approved biologist will conduct clearance surveys at the beginning  
31          of each day and regularly throughout the workday when construction activities are  
32          occurring that may result in take of California tiger salamander. Surveys will be conducted  
33          in the same manner as the preconstruction surveys.
- 34          13. If a California tiger salamander is observed at any point within a work area, the USFWS- and  
35          CDFW-approved biologist will implement the following species observation and handling  
36          protocol. Only USFWS- and CDFW-approved biologists will participate in activities  
37          associated with the capture, handling, and monitoring of California tiger salamanders. If a  
38          California tiger salamander is encountered in a construction area, activities within the  
39          vicinity of the individual will cease immediately and the construction manager and USFWS-  
40          and CDFW- approved biologist will be notified. The California tiger salamander will be  
41          allowed to leave the area of its own volition, and work may resume when it is no longer in  
42          harm's way. All personnel on-site will be notified of the finding and at no time will work  
43          occur in the vicinity of the California tiger salamander without a USFWS- and CDFW-  
44          approved biologist present. If the salamander does not move out of the area on its own, and  
45          it is determined by the approved biologist that relocating the California tiger salamander is  
46          necessary, these steps will be followed:

- 1 a. Prior to handling and relocation, the USFWS- and CDFW-approved biologist will take  
2 precautions to prevent introduction of amphibian diseases in accordance with the  
3 *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a*  
4 *Negative Finding of the California Tiger Salamander* (U.S. Fish and Wildlife Service 2003),  
5 or the most up-to-date guidance available at the time. Disinfecting equipment and  
6 clothing is especially important when biologists are coming to the action area to handle  
7 amphibians after working in other aquatic habitats. California tiger salamanders will  
8 also be handled and assessed according to the *Restraint and Handling of Live Amphibians*  
9 (U.S. Geological Survey National Wildlife Health Center 2001), or the most up-to-date  
10 guidance available at the time.
- 11 b. California tiger salamanders will be captured by hand, dipnet, or other USFWS- and  
12 CDFW-approved methodology, transported, and relocated to nearby suitable habitat  
13 outside of the work area and released as soon as practicable the same day of capture.  
14 Individuals will be relocated no greater than 300 feet outside of the work area to areas  
15 with an active rodent burrow or burrow system (unless otherwise approved by USFWS).  
16 Holding/transporting containers and dipnets will be thoroughly cleaned, disinfected,  
17 and rinsed with fresh water prior to use within the action area. USFWS and CDFW will  
18 be notified within 24 hours of all capture, handling, and relocation efforts. USFWS- and  
19 CDFW-approved biologists will wear clean, new disposable surgical style (nitrile, etc.)  
20 gloves and/or ensure that their hands are free of soaps, oils, creams, lotions, repellents,  
21 or solvents of any sort while capturing and relocating individuals. To avoid transferring  
22 disease or pathogens in handling of the amphibians, USFWS- and CDFW-approved  
23 biologists will follow the Declining Amphibian Populations Task Force’s “Code of  
24 Practice” or the most recent guidance.
- 25 c. If an injured California tiger salamander is encountered and the USFWS- and CDFW-  
26 approved biologist determines the injury is minor or healing and the salamander is  
27 likely to survive, the salamander will be released immediately, consistent with the  
28 preapproved relocation plan as described above. The California tiger salamander will be  
29 monitored until it is determined that it is not imperiled by predators or other dangers.
- 30 d. If the USFWS- and CDFW-approved biologist determines that the California tiger  
31 salamander has major or serious injuries because of activities at the work site, the  
32 USFWS- and CDFW-approved biologist, or designee, will immediately take it to a  
33 USFWS- and CDFW-approved facility. If taken into captivity, the individual will not be  
34 released into the wild unless it has been kept in quarantine and the release is authorized  
35 by USFWS. DWR will bear any costs associated with the care or treatment of such  
36 injured California tiger salamanders. The circumstances of the injury, the procedure  
37 followed, and the final disposition of the injured animal will be documented in a written  
38 incident report. Notification to USFWS and CDFW of an injured or dead California tiger  
39 salamander in the project area will be reported within 24 hours and will include details  
40 such as whether or not its condition resulted from activities related to the proposed  
41 project. In addition, the USFWS- and CDFW-approved biologist will follow up with  
42 USFWS and CDFW in writing within 2 calendar days of the finding. Written notification  
43 to USFWS and CDFW will include the following information: the species, number of  
44 animals taken or injured, sex (if known), date, time, location of the incident or of the  
45 finding of a dead or injured animal, how the individual was taken, photographs of the  
46 specific animal, the names of the persons who observed the take or found the animal,

1 and any other pertinent information. Dead specimens will be preserved, as appropriate,  
2 and held in a secure location until instructions are received from USFWS regarding the  
3 disposition of the specimen.

4 14. The USFWS- and CDFW-approved biologist will have the authority to stop activities at the  
5 work site if they determine that any of avoidance and minimization measures are not being  
6 fulfilled.

7 15. If the exclusion fence is compromised during the rainy season, when California tiger  
8 salamanders are likely to be active, the fence will be repaired and a survey will be conducted  
9 immediately preceding construction activity that occurs in modeled or suitable California  
10 tiger salamander habitat, as determined by a USFWS- and CDFW-approved biologist, or in  
11 advance of any activity that may result in take of the species. The biologist will search along  
12 exclusion fences, and beneath vehicles each morning before they are moved. The survey will  
13 include a careful inspection of all potential hiding spots, such as along exclusion fencing;  
14 large, downed woody debris; and the perimeter of ponds, wetlands, and riparian areas. Any  
15 California tiger salamanders found will be captured and relocated according to the  
16 USFWS/CDFW-approved relocation plan.

17 16. If work must be conducted at night within 300 feet of California tiger salamander habitat, all  
18 lighting will be directed away and shielded from California tiger salamander habitat outside  
19 the construction area to minimize light spillover to the greatest extent possible. If light  
20 spillover into adjacent California tiger salamander habitat occurs, a USFWS- and CDFW-  
21 approved biologist will be present during night work to survey for burrows and emerging  
22 California tiger salamanders in areas illuminated by construction lighting. If California tiger  
23 salamander is found aboveground the USFWS- and CDFW-approved biologist has the  
24 authority to terminate the project activities until the light is directed away from the  
25 burrows, the California tiger salamander moves out of the illuminated area, or the California  
26 tiger salamander is relocated out of the illuminated area by the USFWS- and CDFW-  
27 approved biologist.

28 17. If requested before, during, or upon completion of ground disturbance and construction  
29 activities where suitable California tiger salamander habitat is present, DWR will require  
30 that USFWS and CDFW can access and inspect the work site for compliance with the  
31 description of the project and avoidance and minimization measures, and to evaluate effects  
32 on the California tiger salamander and its habitat. A USFWS- and CDFW-approved biologist  
33 will be on-site during all activities that may result in take of California tiger salamander.

#### 34 **Mitigation Measure BIO-22b: Avoid and Minimize Operational Traffic Impacts on Wildlife**

35 DWR will implement the following measures to avoid and minimize wildlife-vehicle collisions on  
36 DWR facility access roads.

37 1. Vehicles will observe a maximum speed limit of 15 miles per hour on unpaved non-public  
38 DWR access roads where it is safe and feasible to do so. Vehicles will observe a maximum  
39 speed limit of 30 miles per hour on paved, non-public DWR access roads. Speed limits will  
40 be posted in both directions.

41 2. To extent practicable, traffic control structures, such as speed bumps, will be utilized to  
42 reduce speeds.

- 1           3. Wildlife crossing signs will be posted in both directions on new or widened access roads  
2           that overlap with habitat for special-status wildlife, to the extent practicable.

### 3           ***Mitigation Impacts***

4           As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
5           mitigation measure impacts. The analyses below consider the potential impacts associated with  
6           implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
7           Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
8           *Measures*.

### 9           *Compensatory Mitigation*

10          Implementation of the CMP could result in impacts on California tiger salamander through tidal  
11          wetland habitat restoration and channel margin enhancement because potential areas identified  
12          include the Cache Slough Complex and Yolo Bypass (Appendix 3F, Section 3F.4.3.4.2), which occurs  
13          adjacent to modeled habitat for the species and several records near the western portion of the  
14          Cache Slough Complex. Grading and fill to support these activities could directly affect habitat or  
15          result in changes to topography and soils such that the hydrology of vernal pools is altered.

16          The creation and enhancement of wetlands and other waters as well as habitat for special-status  
17          species under the project's CMP on Bouldin Island and the I-5 ponds would not result in effects on  
18          California tiger salamander because there is no habitat for this species in these areas.

19          In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
20          enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in the temporary  
21          disturbance of existing habitat and the potential for injury or mortality of California tiger  
22          salamander but could ultimately provide benefits for the species. Site-specific analyses are not  
23          provided because locations of potential non-bank sites are not currently known.

24          Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
25          crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
26          management of agricultural areas but may also include natural communities in the study area  
27          (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
28          *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
29          CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
30          CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas would not likely include habitat for  
31          California tiger salamander and therefore the species would not likely be affected. Site-specific  
32          analyses are not provided because locations of potential site protection instruments are not  
33          currently known.

34          The CMP and site-specific permitting approvals would account for any losses of California tiger  
35          salamander habitat from restoration and enhancement activities by mitigating for any habitat losses  
36          (Appendix 3F, Section 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General*  
37          *Design Guidelines*), and therefore reducing any habitat losses associated with the CMP to a less-than-  
38          significant level. The habitat creation activities would also have the potential to cause injury and  
39          mortality of California tiger salamander. Environmental Commitments EC-1: *Conduct Worker*  
40          *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
41          *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
42          *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce the



1 potential for injury and mortality to a less-than-significant level. These impacts would be less than  
2 significant because the aforementioned measures would (1) train construction staff on the needs of  
3 protecting habitat, reporting requirements, and the ramifications of not following these measures;  
4 (2) implement spill prevention and containment plans that would avoid material spills that could  
5 affect the viability of nearby habitat; and (3) have a biological monitor present to ensure that non-  
6 disturbance buffers and associated construction fencing are intact and all other protective measures  
7 are being implemented, where applicable.

8 The impact on California tiger salamander from the project alternatives with the CMP would be less  
9 than significant with mitigation.

#### 10 Other Mitigation Measures

11 Some mitigation measures would involve ground disturbance and the use of heavy equipment that  
12 would have the potential to result in loss of modeled California tiger salamander upland habitat or  
13 result in injury, mortality, and disruption of normal behaviors of California tiger salamander adults,  
14 larvae, or eggs from ground disturbance, noise, vibration, or inadvertent discharge of construction-  
15 related sediment or fluids such as fuels, oils, and cement. Impacts on California tiger salamander  
16 resulting from implementation of mitigation measures would be similar to construction effects of  
17 the project alternatives in certain construction areas and would contribute to California tiger  
18 salamander impacts of the project alternatives.

19 However, the impacts of habitat loss, ground disturbance, noise, visual disturbance, and exposure to  
20 sediment or hazardous materials on California tiger salamander would be reduced through the CMP;  
21 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
22 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
23 *Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; EC-14: *Construction Best*  
24 *Management Practices for Biological Resources*; and Mitigation Measure BIO-22a: *Avoid and Minimize*  
25 *Impacts on California Tiger Salamander*. Therefore, impacts on California tiger salamander from  
26 implementation of other mitigation measures would be reduced to less than significant.

27 Overall, the impacts on California tiger salamander from construction of compensatory mitigation  
28 and implementation of other mitigation measures, combined with project alternatives, would not  
29 change the impact conclusion of less than significant with mitigation.

#### 30 **Impact BIO-23: Impacts of the Project on Western Spadefoot Toad**

31 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
32 information on the species life history and habitat suitability model for western spadefoot toad are  
33 presented in the species account in Appendix 13B, Section 13B.48, *Western Spadefoot*.

#### 34 ***All Project Alternatives***

##### 35 Construction

36 The construction of Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c would result in the permanent and  
37 temporary loss and indirect effects on modeled western spadefoot toad habitat. Construction-  
38 related grading and excavation would result in the permanent and temporary loss of western  
39 spadefoot toad upland habitat (Table 13-59). These impacts would primarily occur as a result of the  
40 construction of the South Delta Outlet and Control Structure (permanent and temporary upland

1 impacts) and the installation of the SCADA lines in the Southern Complex and near the intakes  
 2 (temporary upland impacts). Environmental Commitment EC-14: *Construction Best Management*  
 3 *Practices for Biological Resources* would ensure that temporarily disturbed areas are restored  
 4 (Appendix 3B). Work associated with the construction of the South Delta Outlet and Control  
 5 Structure would occur within less than 50 feet west of modeled aquatic habitat and the construction  
 6 of the park-and-ride facility off Hood-Franklin Road would be within 200 feet of modeled aquatic  
 7 habitat (Figure 13B.48-1), which could result in a permanent change to the hydrology of this aquatic  
 8 habitat from a reduction in the size of the supporting watershed and the potential to alter the  
 9 subsurface hydrology, subsequently reducing the habitat's ability to support western spadefoot toad  
 10 breeding. The park-and-ride lot would be removed following construction. For Alternatives 2a and  
 11 4a, a temporary work area associated with the South Delta Outlet and Control Structure would be  
 12 approximately 125 feet south of another area of modeled aquatic habitat and similarly could  
 13 temporarily or permanently change the hydrology of this habitat (Figure 13B.48-1).

14 **Table 13-59. Impacts on Modeled Habitat for Western Spadefoot Toad by Alternative**

Alternative	Permanent Impacts— Aquatic (acres) <sup>a</sup>	Permanent Impacts— Upland (acres) <sup>a</sup>	Temporary Impacts— Aquatic (acres)	Temporary Impacts— Upland (acres)	Total (acres)
1	0.00	38.61	0.00	3.20	41.81
2a	0.00	55.62	0.00	3.62	59.24
2b	0.00	35.31	0.00	3.69	39.00
2c	0.00	38.22	0.00	3.59	41.81
3, 4c	0.00	37.75	0.00	3.57	41.32
4a	0.00	55.15	0.00	3.60	58.75
4b	0.00	34.84	0.00	3.65	38.49
5	0.20	32.83	0.00	4.17	37.20

15 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 16 discussion in Section 13.3.1.2.

17 The construction of Alternative 5 would also result in the permanent and temporary loss of western  
 18 spadefoot toad modeled habitat, including potential indirect effects on habitat as a result of grading  
 19 and excavation. These impacts would occur primarily as a result of the construction of the Bethany  
 20 Reservoir Aqueduct (permanent and temporary upland and aquatic impacts), construction of the  
 21 Bethany Reservoir Discharge Structure and associated access road (permanent and temporary  
 22 upland impacts), and the installation of the SCADA lines near the intakes (temporary upland  
 23 impacts). Environmental Commitment EC-14: *Construction Best Management Practices for Biological*  
 24 *Resources* would ensure that temporarily disturbed areas are restored (Appendix 3B). The  
 25 construction of the Bethany Reservoir Aqueduct would affect a portion of a linear vernal pool that  
 26 appears to feed into a large pool farther downslope and would be within 30 feet of another pool  
 27 (Figure 13B.48-1), all of which are modeled as aquatic habitat for western spadefoot toad.  
 28 Constructing these facilities could result in a permanent change to the hydrology of this aquatic  
 29 habitat from a reduction in the size of the supporting watershed and the potential to alter the  
 30 subsurface hydrology, subsequently reducing the habitat's ability to support western spadefoot toad  
 31 breeding.

32 Construction activities associated with the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b,  
 33 and 4c) and Bethany Complex (Alternative 5) for all project alternatives could result in the injury

1 and mortality of western spadefoot toad if they are moving on the surface or occupying  
2 underground refugia during activities such as grading, excavation, soil compaction, and the use of  
3 construction-related vehicles. Western spadefoot toad could also be trapped in open trenches or  
4 other excavations and become vulnerable to desiccation and predation. Construction activities could  
5 also result in the exposure of toads to construction-related fluids, such as fuels, oils, and cement,  
6 which could result in the injury and mortality of eggs, larvae, and adults. Construction lighting  
7 during night work could disrupt normal behaviors of western spadefoot toad if lighting spills over  
8 into adjacent habitats, potentially resulting in delayed dispersal movements and subjecting toads to  
9 increased predation risk. Construction noise and vibration could also disrupt normal behaviors and  
10 result in increased energy expenditures, predation risk, and potential for injury and mortality from  
11 nearby construction if these activities result in individuals leaving underground cover. The use of  
12 tunnel boring machines during construction would potentially cause groundborne vibration in the  
13 immediate vicinity of tunnel construction areas. However, because of the depth at which the tunnel  
14 would be constructed, and because the deep soil cover over the tunnel would effectively dampen  
15 and absorb propagated energy from the tunnel crown and the tunnel floor, no significant noise and  
16 vibration effects from the operation of the tunnel boring machine on western spadefoot toad are  
17 anticipated (Chapter 24, Section 24.4.3.2, *Impacts of the Project Alternatives Related to Noise and*  
18 *Vibration*). Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop*  
19 *and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
20 *Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
21 *Practices for Biological Resources* (Appendix 3B) by (1) training construction staff on protecting  
22 sensitive biological resources, reporting requirements, and the ramifications for not following these  
23 measures; (2) implementing spill prevention and containment plans that would avoid material spills  
24 that could affect the viability of nearby aquatic and upland habitat; (3) by having a biological  
25 monitor present to ensure that non-disturbance buffers and associated construction fencing are  
26 intact and all other protective measures are being implemented, where applicable; and (4) limiting  
27 construction vehicle traffic to a maximum speed limit of 15 miles per hour on unpaved, non-public  
28 construction access roads.

29 One CNDDDB occurrence for western spadefoot toad falls within road improvement areas for all  
30 alternatives just north of SR 4 (California Department of Fish and Wildlife 2020a). This record  
31 (#1,366) from 1922 is considered to be being possibly extirpated (California Department of Fish and  
32 Wildlife 2020a). There are no other records in the study area. There are several occurrences to the  
33 west of the study area in portions of Alameda and San Joaquin Counties (California Department of  
34 Fish and Wildlife 2020a).

35 Field investigations for all project alternatives would be conducted prior to and during construction  
36 to more specifically identify appropriate construction methods and design criteria addressed in the  
37 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
38 and address the establishment of geological and groundwater monitoring programs (Delta  
39 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
40 variety of ground-disturbing activities that would vary in duration from several hours to  
41 approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
42 Construction Authority 2022a, 2022b) and could result in impacts on habitat and the potential for  
43 injury, mortality, and the disruption of normal behaviors of western spadefoot toad. Geotechnical  
44 investigations that would occur in the West Tracy Fault Study area for all alternatives and the tunnel  
45 for the Bethany Reservoir Aqueduct (Alternative 5), which include test trenches, CPTs, soil borings,  
46 and geophysical arrays, would result in temporary impacts on western spadefoot toad habitat

1 (Appendix 13C). The geotechnical investigations over the conveyance tunnels linking the intakes to  
2 the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4) and to the Bethany Complex  
3 (Alternative 5), and the Bethany Fault Study investigations would not take place in modeled western  
4 spadefoot toad habitat. The following field investigations would be conducted within proposed  
5 surface construction footprints of project facilities (including portions of tunnel alignments) and  
6 would temporarily affect habitat: test trenches, CPTs, soil borings, ERT, groundwater testing and  
7 monitoring, monument installation, pilot studies for settlement, agronomic testing, and utility  
8 potholing. These temporary impacts are not characterized as an additional loss of habitat because  
9 impacts for these locations have already been quantified within the construction footprints but  
10 could still result in the potential for injury, mortality, and the disruption of normal behaviors of  
11 western spadefoot toad, as discussed above for conveyance facility construction. Environmental  
12 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
13 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
14 *Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
15 (Appendix 3B) would reduce these potential impacts by (1) training construction staff on protecting  
16 sensitive biological resources, reporting requirements, and the ramifications for not following these  
17 measures; (2) implementing spill prevention and containment plans that would avoid material spills  
18 that could affect the viability of nearby aquatic and upland habitat; and (3) having a biological  
19 monitor present to ensure that non-disturbance buffers and associated construction fencing are  
20 intact and all other protective measures are being implemented, where applicable.

### 21 Operations

22 All project alternatives have the potential for impacts on western spadefoot toad from operations at  
23 project facilities occurring adjacent to modeled habitat, which includes impacts associated with  
24 vehicle traffic on access roads and permanent project lighting. Western spadefoot toad could be  
25 struck by vehicle traffic during the rainy season (November–April), in particular on rainy nights, on  
26 access roads to the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and the Bethany  
27 Complex (Alternative 5). Lighting at facilities associated with the Southern Complex (Alternatives 1,  
28 2a, 2b, 2c, 3, 4a, 4b, and 4c) and the Bethany Complex (Alternative 5) could disrupt normal  
29 behaviors of western spadefoot toad if lighting at these facilities spills over into adjacent habitats,  
30 potentially resulting in delayed dispersal movements and subjecting them to increased predation  
31 risk. As stated in Chapter 3, Section 3.14.12, *Fencing and Lighting*, permanent lighting at the Bethany  
32 Reservoir Pumping Plant and Surge Basin, and Bethany Reservoir Discharge Structure would be  
33 motion activated, downcast, cut-off type fixtures with non-glare finishes, which would minimize the  
34 potential for this impact. The analysis in Chapter 18, Impact AES-4: *Create New Sources of*  
35 *Substantial Light That Would Adversely Affect Day or Nighttime Views of the Construction Areas or*  
36 *Permanent Facilities*, shows that with the project designs the lighting would be shielded and  
37 oriented in such a manner so as not to subject the immediate surroundings to extremes in levels of  
38 light.

### 39 Maintenance

40 The maintenance of the Southern Complex west of Byron Highway (Alternatives 1, 2a, 2b, 2c, 3, 4a,  
41 4b, and 4c) and the Bethany Complex (Alternative 5) could result in impacts on western spadefoot  
42 toad.

43 Maintenance activities at the South Delta Outlet and Control Structure (Alternatives 1, 2a, 2b, 2c, 3,  
44 4a, 4b, and 4c), which would include annual cleaning (pressure washing), semiannual general and

1 ground maintenance (e.g., mowing, vegetation trimming, herbicide application), and daily or weekly  
2 inspections by vehicle, could result in the injury or mortality of western spadefoot toad. These  
3 impacts would occur if western spadefoot toads are occupying upland areas where vegetation  
4 management takes place, if they are dispersing through these areas, or if chemicals used during  
5 these activities reach aquatic habitat through spills or from storm runoff. There is modeled aquatic  
6 habitat within 50 feet of the facility.

7 Maintenance activities at the Bethany Complex (Alternative 5), which would include repaving of  
8 access roads every 15 years, semiannual general and ground maintenance (e.g., mowing, vegetation  
9 trimming, herbicide application), and daily or weekly inspections by vehicle, could result in the  
10 injury or mortality of western spadefoot toad. These impacts would occur if western spadefoot  
11 toads are occupying uplands in areas where vegetation management takes place or if they are  
12 dispersing through these areas.

### 13 **CEQA Conclusion—All Project Alternatives**

14 The construction, operations, and maintenance of all project alternatives would result in impacts on  
15 western spadefoot toad through the permanent and temporary loss of modeled habitat and the  
16 potential for injury, mortality, and the disruption of normal behaviors.

17 The temporary loss of habitat and the potential impacts of injury, mortality, and the disruption of  
18 normal behaviors of western spadefoot toad from project construction would be reduced by  
19 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
20 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
21 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
22 *Biological Resources* (Appendix 3B). Even with these commitments, however, the permanent loss of  
23 habitat from the construction of the project alternatives and the potential for injury, mortality, and  
24 disruption of normal behaviors from construction, operations, and maintenance, on western  
25 spadefoot toad would be significant. Implementation of the CMP would offset the loss of western  
26 spadefoot habitat through the purchase of mitigation credits for vernal pool fairy shrimp, vernal  
27 pool tadpole shrimp, California tiger salamander, and California red-legged frog (Appendix 3F,  
28 Sections 3F.3.3.3 and 3F.4.2.1.2 and Attachment 3F.1, Table 3F.1-3, CMP-11: *Vernal Pool Fairy*  
29 *Shrimp and Vernal Pool Tadpole Shrimp Habitat*, CMP-13: *California Tiger Salamander Habitat*, and  
30 CMP-14: *California Red-legged Frog Habitat*), which would protect habitat also suitable for western  
31 spadefoot toad and, therefore, reduce the impact associated with habitat loss to a less-than-  
32 significant level. Mitigation Measures AES-4b: *Minimize Fugitive Light from Portable Sources Used for*  
33 *Construction* (Chapter 18), BIO-2b: *Avoid and Minimize Impacts on Terrestrial Biological Resources*  
34 *from Maintenance Activities*, BIO-22b: *Avoid and Minimize Operational Traffic Impacts on Wildlife*,  
35 and BIO-23: *Avoid and Minimize Impacts on Western Spadefoot Toad* would be required to avoid and  
36 minimize the potential for injury, mortality, disruption of normal behaviors, and disturbances to  
37 habitat. The impacts on western spadefoot toad from the project alternatives would be less than  
38 significant with mitigation because these aforementioned measures would replace lost habitat and  
39 reduce direct effects on the species, including habitat disturbance, by designing lighting that avoids  
40 spillover into habitats, thus avoiding disrupting dispersal movements; by avoiding construction and  
41 maintenance activities in and adjacent to habitat to the extent possible; timing construction  
42 activities, installing exclusion fencing, conducting preconstruction surveys, and other protective  
43 measures to avoid and minimize the potential for injury and mortality; and by putting in place traffic  
44 control measures at DWR facilities during operations to minimize the potential for vehicle strikes.

**Mitigation Measure CMP: Compensatory Mitigation Plan**

DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to offset the loss of western spadefoot toad habitat through purchasing mitigation credits for vernal pool fairy shrimp, vernal pool tadpole shrimp, California tiger salamander, and California red-legged frog (Appendix 3F, Sections 3F.3.3.3 and 3F.4.2.1.2 and Attachment 3F.1, Table 3F.1-3, CMP-11: *Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp Habitat*, CMP-13: *California Tiger Salamander Habitat*, and CMP-14: *California Red-legged Frog Habitat*), which would protect habitat within the range of and also suitable for western spadefoot toad.

**Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for Construction**

See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

**Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological Resources from Maintenance Activities**

See description of Mitigation Measure BIO-2b under Impact BIO-2.

**Mitigation Measure BIO-22b: Avoid and Minimize Operational Traffic Impacts on Wildlife**

See description of Mitigation Measure BIO-22b under Impact BIO-22.

**Mitigation Measure BIO-23: Avoid and Minimize Impacts on Western Spadefoot Toad*****All Project Alternatives***

As properties become accessible for initiating project activities within areas of modeled western spadefoot toad habitat, the suitability of the modeled habitat will be assessed on the ground by a biologist qualified to identify aquatic and upland habitat for the species.

For areas verified as being suitable for western spadefoot toad, the following measures will be implemented.

1. Except for limited vegetation clearing necessary to minimize effects on nesting birds, initial suitable upland habitat clearance and disturbance will not be conducted between November 1 and March 31, with the period extending to April 30 during wet years. Once the initial ground disturbance has occurred, the area has been surveyed, and exclusionary fencing is in place, work in the disturbed area can occur outside the construction window.
2. Where construction or restoration activities take place in aquatic habitat, activities will not be initiated until after the habitat is no longer ponding water or until a biologist has surveyed the aquatic habitat for presence of western spadefoot toad larvae. No work or dewatering will be allowed in occupied habitat. If a work site is to be temporarily dewatered by pumping, intakes will be completely screened with wire mesh not larger than 5 millimeters to prevent larger aquatic species from entering the pump system.
3. Ground-disturbing activities will be designed to minimize or eliminate effects on rodent burrows that may provide suitable upland habitat for western spadefoot toad. Surface-disturbing activities will avoid areas with a high concentration of burrows to the greatest extent practicable. In addition, when a concentration of burrows is present in a work site,

- 1 the area plus a 50-foot buffer will be staked or flagged to ensure that work crews are aware  
2 of their location and to facilitate avoidance of the area.
- 3 4. All initial ground disturbance or vegetation removal (clearing) will be limited to periods of  
4 no or low rainfall (less than 0.08 inch per 24-hour period and less than 40% chance of rain).  
5 To the extent practicable, clearing activities within western spadefoot toad habitat will  
6 cease 24 hours prior to a 40% or greater forecast of rain from the closest NWS weather  
7 station. Clearing may continue 24 hours after the rain ceases, if no more than 0.5 inch of  
8 precipitation is in the 72-hour forecast. If clearing must continue when rain is forecast  
9 (greater than 40% chance of rain), a qualified biologist will survey the work site before  
10 clearing begins each day rain is forecast. If rain exceeds 0.5 inch during a 24-hour period,  
11 clearing will cease until the NWS forecasts no further rain. For a given site that has exclusion  
12 fencing in place and all surface soil disturbance completed (i.e., no burrows present), these  
13 restrictions would no longer apply.
- 14 5. To the extent possible, earthmoving and construction activities will cease no less than 30  
15 minutes before sunset and will not begin again until no less than 30 minutes after sunrise  
16 within 300 feet of western spadefoot toad habitat. Except when necessary for driver or  
17 pedestrian safety, to the greatest extent practicable, artificial lighting at a work site will be  
18 prohibited during the hours of darkness.
- 19 6. The perimeter of construction and restoration sites within western spadefoot toad habitat  
20 will be fenced with fencing material suitable for excluding amphibians by no more than 14  
21 days prior to the start of construction activities (e.g., staging, vegetation removal, grading) in  
22 a given area. The construction manager and qualified biologist will determine where  
23 exclusion fencing will be installed to protect western spadefoot toad habitat adjacent to the  
24 defined site footprint and to minimize the potential for toads to enter the construction work  
25 area. DWR will include the amphibian exclusion fence specifications including installation  
26 and maintenance criteria in the bid solicitation package special provisions. The amphibian  
27 exclusion fencing will remain in place for the duration of construction and will be regularly  
28 inspected and fully maintained. A biological monitor and construction manager will be  
29 responsible for checking the exclusion fencing around the work areas each day of  
30 construction for wildlife trapped inside and to ensure that they are intact and upright. This  
31 will be especially critical during times of inclement weather that can damage the fencing.  
32 Repairs to the amphibian exclusion fence will be made within 24 hours of discovery of a  
33 breach. Where construction access is necessary, gates will be installed in the exclusion fence  
34 and fencing will direct animals away from the work area to the extent practicable (e.g.,  
35 fencing will flare out and turn back toward suitable habitat).
- 36 7. Preconstruction surveys will be conducted by a qualified biologist immediately prior to the  
37 initiation of any ground-disturbing activities or vegetation clearing, including immediately  
38 prior to exclusion fence installation, in areas identified as having suitable western spadefoot  
39 toad habitat. These surveys will consist of walking surveys within the work sites and  
40 investigating suitable aquatic and upland habitat including potential refugia habitat such as  
41 small woody debris, refuse, burrow entrances, etc., that are not directly disturbed by project  
42 activities. If there is a lapse in construction in a work area for 7 days or more, these surveys  
43 will be repeated before activities resume.
- 44 8. If the exclusion fence is compromised during the rainy season, a survey will be conducted  
45 immediately preceding construction activity that occurs in suitable western spadefoot toad

- 1 habitat, or in advance of any activity that may result in take of the species. The biologist will  
2 search along exclusion fences, and beneath vehicles each morning before they are moved.  
3 Surveys will be conducted in the same manner as the preconstruction surveys.
- 4 9. If a western spadefoot toad is encountered in a construction or restoration area, activities  
5 within the vicinity of the animal will cease immediately and the construction manager and  
6 biological monitor will be notified. The toad will be allowed to leave the area of its own  
7 volition, and work may resume when it is no longer in harm's way. If the toad does not move  
8 out of the area on its own, and it is determined by the biologist that relocating is necessary,  
9 these steps will be followed:
- 10 a. Prior to handling and relocation, the biologist will take precautions to prevent  
11 introduction of amphibian diseases by following guidance in *The Declining Amphibian*  
12 *Task Force Fieldwork Code of Practice* (U.S. Fish and Wildlife Service 2019:1) or the most  
13 up-to-date guidance available at the time. Western spadefoot toads will also be handled  
14 and assessed according to the *Restraint and Handling of Live Amphibians* (U.S. Geological  
15 Survey National Wildlife Health Center 2001) or the most up-to-date guidance available  
16 at the time.
- 17 b. Western spadefoot toads will be captured by hand, dipnet, or other CDFW-approved  
18 methodology, transported, and relocated to nearby suitable habitat outside of the work  
19 area and released as soon as practicable the same day of capture.

## 20 ***Mitigation Impacts***

21 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
22 mitigation measure impacts. The analyses below consider the potential impacts associated with  
23 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
24 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
25 *Measures*.

### 26 *Compensatory Mitigation*

27 The creation and enhancement of wetlands and other waters, as well as habitat for special-status  
28 species at the I-5 ponds under the project's CMP, would temporarily affect modeled habitat for  
29 western spadefoot toad (Appendix 13C) from vegetation removal and grading to create the  
30 appropriate topography and soil conditions to establish/restore habitats. The CMP could also affect  
31 modeled upland habitat for western spadefoot toad through tidal wetland habitat restoration and  
32 channel margin enhancement because potential areas identified generally overlap with modeled  
33 habitat (Appendix 3F, Section 3F.4.3.4.2).

34 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
35 enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in the temporary  
36 disturbance of existing habitat and the potential for injury or mortality of western spadefoot toad  
37 but could ultimately provide benefits for the species. Site-specific analyses are not provided because  
38 locations of potential non-bank sites are not currently known.

39 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
40 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
41 management of agricultural areas but may also include natural communities in the study area  
42 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*



1 *Habitat, CMP-18b: Sandhill Crane Foraging Habitat, CMP-19a: Swainson's Hawk Nesting Habitat,*  
2 *CMP-19b: Swainson's Hawk Foraging Habitat, CMP-22a: Tricolored Blackbird Nesting Habitat, and*  
3 *CMP-22b: Tricolored Blackbird Foraging Habitat).* These areas would not likely include habitat for  
4 western spadefoot toad and therefore would not likely be affected. Site-specific analyses are not  
5 provided because locations of potential site protection instruments are not currently known.

6 The CMP and site-specific permitting approvals would ensure that there is no significant loss in  
7 habitat or habitat value by adjusting the overall commitment (Appendix 3F, Section 3F.1, Section  
8 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General Design Guidelines*) and, therefore, reduce  
9 any habitat losses associated with the CMP to a less-than-significant level. These activities would  
10 also have the potential for injury, mortality, and the disruption of normal behaviors of individuals.  
11 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-3: *Develop and*  
12 *Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best*  
13 *Management Practices for Biological Resources* (Appendix 3B) and Mitigation Measure BIO-23: *Avoid*  
14 *and Minimize Impacts on Western Spadefoot Toad* would reduce these potential impacts to a less-  
15 than-significant level by (1) training construction staff on protecting sensitive biological resources,  
16 reporting requirements, and the ramifications for not following these measures; (2) implementing  
17 spill prevention and containment plans that would avoid material spills that could affect toads and  
18 their habitat; and (3) having a biological monitor present to ensure that non-disturbance buffers and  
19 associated construction fencing are intact and all other protective measures are being implemented,  
20 where applicable.

21 The impact on western spadefoot toad from the project alternatives with the CMP would be less  
22 than significant with mitigation.

### 23 *Other Mitigation Measures*

24 Some mitigation measures would involve ground disturbance and the use of heavy equipment that  
25 would have the potential to result in loss of modeled western spadefoot toad upland habitat or  
26 permanently change the hydrology of aquatic habitat within 200 feet of construction areas.  
27 Mitigation measures could also result in injury, mortality, and disruption of normal behaviors of  
28 western spadefoot toad adults, larvae, or eggs from ground disturbance, noise, vibration, or  
29 inadvertent discharge of construction-related sediment or fluids such as fuels, oils, and cement. The  
30 mitigation measures with potential to result in impacts on western spadefoot toad are similar to  
31 those discussed under Impact BIO-22: *Impacts of the Project on California Tiger Salamander*. Impacts  
32 on western spadefoot toad resulting from mitigation measures would be similar to construction  
33 effects of the project alternatives in certain construction areas and would contribute to western  
34 spadefoot toad impacts of the project alternatives.

35 The impacts of habitat loss, ground disturbance, noise, visual disturbance, and exposure to sediment  
36 or hazardous materials on western spadefoot toad would be reduced through the CMP and  
37 environmental commitments as detailed under Impact BIO-22. In addition, Mitigation Measure BIO-  
38 23: *Avoid and Minimize Impacts on Western Spadefoot Toad* would require species-specific measures  
39 to reduce these impacts. Therefore, impacts on western spadefoot toad from implementation of  
40 other mitigation measures would be reduced to less than significant.

41 Overall, the impacts on western spadefoot toad from construction of compensatory mitigation and  
42 implementation of other mitigation measures, combined with project alternatives, would not change  
43 the impact conclusion from less than significant with mitigation.

## 1 **Impact BIO-24: Impacts of the Project on California Red-Legged Frog**

2 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
 3 information on the species life history and habitat suitability model for California red-legged frog  
 4 are presented in the species account in Appendix 13B, Section 13B.49, *California Red-Legged Frog*.

### 5 ***All Project Alternatives***

#### 6 ***Construction***

7 The construction of Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c would result in the permanent and  
 8 temporary loss of modeled California red-legged frog habitat as a result of grading and excavation  
 9 (Table 13-60). These impacts would occur as a result of the construction of new access roads and  
 10 the temporary rail spur to the Southern Forebay (permanent and temporary upland and aquatic  
 11 impacts), realigned Byron Highway (permanent and temporary upland and aquatic impacts), and  
 12 construction of the Southern Forebay (permanent aquatic impact) (Figure 13B.49-1). The access  
 13 road and the temporary rail spur, which parallel each other, would cross Brushy Creek and the  
 14 northern fork of Italian Slough, both of which are identified as modeled aquatic habitat. Another  
 15 unnamed channel identified as modeled aquatic habitat that ultimately flows into Italian Slough  
 16 would be affected by the realigned Byron Highway. These crossings would require culverts to  
 17 maintain the flow of water; however, no specific designs are yet available for these crossings. The  
 18 modeled aquatic habitat affected by the construction of the Southern Forebay is a small  
 19 (approximately 0.03 acre) depression wetland surrounded by agricultural fields (i.e., alfalfa and  
 20 miscellaneous grain and hay) and is located approximately 2 miles north of a CNDDDB occurrence at  
 21 Italian Slough (#862, California Department of Fish and Wildlife 2020a). Environmental  
 22 Commitment EC-14: *Construction Best Management Practices for Biological Resources* would ensure  
 23 that temporarily disturbed areas are restored (Appendix 3B).

24 **Table 13-60. Impacts on Modeled Habitat for California Red-Legged Frog by Alternative**

Alternative	Permanent Impacts— Aquatic (acres) <sup>a</sup>	Permanent Impacts— Upland (acres) <sup>a</sup>	Temporary Impacts— Aquatic (acres)	Temporary Impacts— Upland (acres)	Total (acres)
1, 2a, 2b, 2c, 3, 4a, 4b, 4c	0.47	5.98	1.17	6.48	14.10
5	0.21	7.00	0.12	2.71	10.04

25 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 26 discussion in Section 13.3.1.2.  
 27

28 The construction of Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c would result in the fragmentation of  
 29 modeled habitat for California red-legged frog and create barriers to the movement of the species  
 30 from areas east of Byron Highway to areas to the west. These impacts would result from the  
 31 construction of the new intersection of Byron Highway and Armstrong Road, a new access road from  
 32 Byron Highway east to the Southern Forebay, and the access road and parallel temporary rail spur  
 33 (Figure 13B.49-1). There have been two reported observations of California red-legged frog in  
 34 Italian Slough from 2003 (occurrence #862) (California Department of Fish and Wildlife 2020a). The  
 35 construction of the permanent access road and the temporary rail spur, which would be used for the  
 36 construction of the Southern Forebay over a period of 7 years, would add to existing barriers to  
 37 movement in this area, which include the existing Union Pacific Railroad and Byron Highway. The

1 installation of culverts over Brushy Creek and Italian Slough would maintain connectivity of those  
2 aquatic habitat and would allow some adult movement but the rail spur and access road would still  
3 represent some barrier to movement. The fragmentation of habitat and barriers to movement would  
4 reduce the quality of the remaining habitat and reduce genetic exchange between areas of occupied  
5 habitat.

6 The construction of Alternative 5 would result in the permanent and temporary loss of modeled  
7 California red-legged frog habitat as a result of grading and excavation (Table 13-60). These impacts  
8 would occur as a result of the construction of the Bethany Reservoir Aqueduct (permanent and  
9 temporary upland impacts), Byron Highway/Lindeman Road intersection improvements  
10 (permanent upland and aquatic impacts), the widening of Mountain House Road (permanent and  
11 temporary upland and aquatic impacts), and the construction of a new interchange for Mountain  
12 House Road and Grant Line Road (permanent and temporary upland and aquatic impacts) (Figure  
13 13B.49-1). The improvements on Mountain House Road would require the replacement of existing  
14 culverts with longer ones to accommodate the wider road over two unnamed channels, the  
15 southernmost of which has a record for California red-legged frog (occurrence #602), and the  
16 construction of a new crossing over Mountain House Creek, which also has a record for the species  
17 (occurrence #27) (California Department of Fish and Wildlife 2020a). Environmental Commitment  
18 EC-14: *Construction Best Management Practices for Biological Resources* would ensure that  
19 temporarily disturbed areas are restored (Appendix 3B).

20 The construction of Alternative 5 would result in the fragmentation of modeled dispersal habitat for  
21 California red-legged frog and create barriers to the movement of the species from the presence of  
22 the Bethany Reservoir Aqueduct, the widening of Mountain House Road, the construction of a new  
23 interchange for Mountain House Road and Grant Line Road, and the new access road to the Bethany  
24 Reservoir Discharge Structure (Figure 13B.49-1). The fragmentation of habitat and barriers to  
25 movement would reduce the quality of the remaining habitat and reduce genetic exchange between  
26 areas of occupied habitat. There are California red-legged frog occurrences that are located  
27 approximately 0.4 mile from either side of the Bethany Reservoir Aqueduct (e.g., occurrences #28,  
28 #100) (California Department of Fish and Wildlife 2020a); however, the aqueduct does not  
29 represent a complete barrier because of the tunneled portion leading to Bethany Reservoir.  
30 Mountain House Road and the new access road also increase the barriers to movement between an  
31 occurrence immediately to the south (#415) and to several to the north (e.g., #266, #384)  
32 (California Department of Fish and Wildlife 2020a). Both roads do not represent complete barriers  
33 but do increase the potential for road mortality and the presence of more unsuitable habitat.  
34 Construction of the new interchange for Mountain House Road and Grant Line Road would increase  
35 barriers to movement for frogs documented in Mountain House Creek (occurrence #27) to areas to  
36 the north and south (California Department of Fish and Wildlife 2020a).

37 Alternative 5 would also result in permanent and temporary impacts on modeled upland and  
38 aquatic habitat that is located within critical habitat for California red-legged frog (unit CCS-2B)  
39 primarily as a result of constructing the access road to the Bethany Reservoir Discharge Structure  
40 and the Aqueduct (Table 13-61). The affected aquatic habitat is a channel that would be affected by  
41 the widening of Mountain House Road (Figure 13B.49-1).

**Table 13-61. Impacts on Modeled Habitat within Critical Habitat for California Red-Legged Frog by Alternative**

Alternative	Permanent Impacts—Aquatic (acres) <sup>a</sup>	Permanent Impacts—Upland (acres) <sup>a</sup>	Temporary Impacts—Aquatic (acres)	Temporary Impacts—Upland (acres)	Total (acres)
1, 2a, 2b, 2c, 3, 4a, 4b, 4c	0.00	0.00	0.00	0.00	0.00
5	0.01	1.64	0.01	1.15	2.81

<sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see discussion in Section 13.3.1.2.

Construction activities associated with the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and Bethany Complex (Alternative 5) could result in the injury and mortality of California red-legged frog if they are moving on the surface or occupying small mammal burrows or soil crevices during activities such as grading, excavation, soil compaction, and the use of construction-related vehicles. California red-legged frog could also be trapped in open trenches or other excavations and become vulnerable to desiccation and predation. Construction activities could also result in the exposure of California red-legged frog to construction-related fluids, such as fuels, oils, and cement, which could result in the injury and mortality of eggs, larvae, and adults. Construction lighting during night work could disrupt normal behaviors of California red-legged frog if lighting spills over into adjacent habitats, potentially disrupting foraging and breeding activities. Construction noise and vibration could also disrupt normal behaviors and result in increased energy expenditures. The use of tunnel boring machines during construction would potentially cause groundborne vibration in the immediate vicinity of tunnel construction areas. However, because of the depth at which the tunnel would be constructed, and because the deep soil cover over the tunnel would effectively dampen and absorb propagated energy from the tunnel crown and the tunnel floor, no significant noise and vibration effects from the operation of the tunnel boring machine on California red-legged frog are anticipated (Chapter 24, Section 24.4.3.2). Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training construction staff on protecting sensitive biological resources, reporting requirements, and the ramifications for not following these measures; (2) implementing spill prevention and containment plans that would avoid material spills that could affect the viability of nearby aquatic and upland habitat; (3) having a biological monitor present to ensure that non-disturbance buffers and associated construction fencing are intact and all other protective measures are being implemented, where applicable; and (4) limiting construction vehicle traffic to a maximum speed limit of 15 miles per hour on unpaved non-public construction access roads and nighttime speed limits to 10 miles per hour on these roads when they occur adjacent to suitable habitat for California red-legged frog.

One CNDDDB occurrence for California red-legged frog falls within the new road right-of-way at Byron Highway and North Bruns Way for Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c (#862, California Department of Fish and Wildlife 2020a). This occurrence is a combination of multiple observations, two from 2003, which were discussed above, and three from 2009. The 2009 portion of the occurrence overlaps with the new intersection and is described as an observation of juvenile and adult frogs in a ditch northwest of the current intersection (Byron Highway and North Bruns

1 Way) and notes its connection to Italian Slough. The habitat model, as written, did not include  
2 agricultural ditches as modeled aquatic habitat and agricultural areas as modeled upland; however,  
3 this area is nonetheless considered to be an extant occurrence and the loss of the associated aquatic  
4 and upland habitat would be determined once on-the-ground conditions are verified.

5 Two CNDDB occurrences are overlapped by road improvements for Alternative 5, the widening of  
6 Mountain House Road (occurrence #602) and the crossing of Mountain House Creek for the new  
7 intersection of Mountain House Road and Grant Line Road (occurrence #27) (California Department  
8 of Fish and Wildlife 2020a). Both areas contain modeled upland and aquatic habitat as previously  
9 discussed and these records consist of multiple observations over many years (California  
10 Department of Fish and Wildlife 2020a).

11 Field investigations for all alternatives would be conducted prior to and during construction under  
12 all alternatives to more specifically identify appropriate construction methods and design criteria  
13 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
14 existing utilities, and address the establishment of geological and groundwater monitoring  
15 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
16 would involve a variety of ground-disturbing activities that would vary in duration from several  
17 hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
18 Construction Authority 2022a, 2022b) and could result in impacts on habitat and the potential for  
19 injury, mortality, and the disruption of normal behaviors of California red-legged frog. Geotechnical  
20 investigations that would occur in the West Tracy Fault Study area, the tunnels linking the Southern  
21 Forebay to the South Delta Outlet and Control Structure (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c),  
22 and the tunnel for the Bethany Reservoir Aqueduct (Alternative 5), which include test trenches,  
23 CPTs, soil borings, and geophysical arrays, would result in temporary impacts on modeled habitat  
24 (Appendix 13C). The Bethany Fault Study geotechnical investigations (Alternative 5) would be  
25 completed in a single day and would involve placing approximately 20 ERT probes 0.5 inch in  
26 diameter. The study would be conducted entirely on foot, perpendicular to the tunneled portion of  
27 the Bethany Reservoir Aqueduct (Delta Conveyance Design and Construction Authority 2022a,  
28 2022b). The Bethany Fault Study could result in minor disruption of normal behaviors, but because  
29 of its small footprint and the short (1 day) duration of the disturbance, impacts on modeled habitat  
30 are not quantified and are considered negligible. The geotechnical investigations over the  
31 conveyance tunnels linking the intakes to the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b,  
32 and 4) and to the Bethany Complex (Alternative 5) would not take place in modeled California red-  
33 legged frog habitat. The following field investigations would be conducted within proposed surface  
34 construction footprints of proposed facilities (including portions of tunnel alignments) and would  
35 temporarily affect habitat: test trenches, CPTs, soil borings, ERT, groundwater testing and  
36 monitoring, monument installation, pilot studies for settlement, agronomic testing, and utility  
37 potholing. These temporary impacts are not characterized as an additional loss of habitat because  
38 impacts for these locations have already been quantified within the construction footprints but  
39 could still result in the potential for injury, mortality, and the disruption of normal behaviors of  
40 California red-legged frog, as discussed above for conveyance facility construction. Environmental  
41 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
42 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
43 *Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
44 (Appendix 3B) would reduce these potential impacts by (1) training construction staff on protecting  
45 sensitive biological resources, reporting requirements, and the ramifications for not following these  
46 measures; (2) implementing spill prevention and containment plans that would avoid material spills

1 that could affect the viability of nearby aquatic and upland habitat; and (3) having a biological  
2 monitor present to ensure that non-disturbance buffers and associated construction fencing are  
3 intact and all other protective measures are being implemented, where applicable.

#### 4 Operations

5 All alternatives have the potential for impacts on California red-legged frog from vehicle traffic on  
6 access roads going to the Southern Forebay and the Bethany Reservoir Discharge Structure. During  
7 operations, there may be times that staff need to access these facilities at night, which, if during the  
8 rainy season (generally October to March), could result in road mortality of dispersing California  
9 red-legged frogs.

#### 10 Maintenance

11 Maintenance at the Southern Forebay under Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c would  
12 include repaving of access roads every 15 years, annual embankment repair, quarterly animal  
13 burrow filling, quarterly weed management (e.g., mechanical removal and herbicide application),  
14 semiannual general and ground maintenance (e.g., mowing, vegetation trimming), and daily or  
15 weekly inspections by vehicle, and could result in the injury and mortality of California red-legged  
16 frogs occupying burrows or dispersing through these areas during these activities.

17 Maintenance activities at the Bethany Complex (Alternative 5), which would include repaving of  
18 access roads every 15 years, semiannual general and ground maintenance (e.g., mowing, vegetation  
19 trimming, herbicide application), and daily or weekly inspections by vehicle, could result in the  
20 injury and mortality of California red-legged frog. These impacts would occur if California red-  
21 legged frogs are occupying burrows in areas where vegetation management takes place or if they  
22 are dispersing through these areas.

#### 23 **CEQA Conclusion—All Project Alternatives**

24 The construction, operation, and maintenance of all project alternatives would result in impacts on  
25 California red-legged frog through the permanent and temporary loss of modeled habitat, the  
26 fragmentation of habitat, barriers to dispersal, and the potential for injury, mortality, and the  
27 disruption of normal behaviors.

28 The temporary loss of habitat and the potential impacts of injury, mortality, and the disruption of  
29 normal behaviors of larvae and adults from project construction would be reduced by  
30 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
31 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
32 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
33 *Biological Resources* (Appendix 3B). Even with these commitments, however, the permanent loss of  
34 habitat from construction of the project alternatives and the potential for injury, mortality, and  
35 disruption of normal behaviors from construction, operations, and maintenance on California red-  
36 legged frog would be significant. Implementation of the CMP would be required to offset the loss of  
37 California red-legged frog habitat through the purchase of conservation credits at a USFWS-  
38 approved mitigation bank (Appendix 3F, Sections 3F.3.3.3 and 3F.4.2.1.2 and Attachment 3F.1, Table  
39 3F.1-3, CMP-14: *California Red-Legged Frog Habitat*), which would reduce the impact associated  
40 with habitat loss to a less-than-significant level. Mitigation Measures AES-4b: *Minimize Fugitive Light*  
41 *from Portable Sources Used for Construction* (Chapter 18), BIO-2b: *Avoid and Minimize Impacts on*  
42 *Terrestrial Biological Resources from Maintenance Activities*, BIO-22b: *Avoid and Minimize*

1 *Operational Traffic Impacts on Wildlife*, BIO-24a: *Avoid and Minimize Impacts on California Red-*  
2 *legged frog*, and BIO-24b: *Compensate for Impacts on Red-legged Frog Habitat Connectivity* would be  
3 required to avoid and minimize the potential for injury, mortality, disruption of normal behaviors,  
4 and disturbances to habitat. The impacts on California red-legged frog from the project alternatives  
5 would be less than significant with mitigation because these aforementioned measures would  
6 replace lost habitat and reduce direct effects on the species, including habitat disturbance, by  
7 designing lighting that avoids spillover into habitats and thus avoiding potential increases in  
8 predation and disrupting normal behaviors; by avoiding construction and maintenance activities in  
9 and adjacent to habitat to the extent possible; timing construction activities, installing exclusion  
10 fencing, conducting preconstruction surveys, and other protective measures to avoid and minimize  
11 the potential for injury and mortality; and by putting in place traffic control measures at DWR  
12 facilities during operations to minimize the potential for vehicle strikes.

### 13 **Mitigation Measure CMP: Compensatory Mitigation Plan**

14 DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to  
15 offset the loss of California red-legged frog habitat by purchasing conservation credits at a  
16 USFWS- and CDFW-approved mitigation bank or through other site protection instruments  
17 (Appendix 3F, Sections 3F.3.3.3 and 3F.4.2.1.2 and Attachment 3F.1, Table 3F.1-3, CMP-14:  
18 *California Red-Legged Frog Habitat*). California red-legged frog aquatic breeding and upland  
19 habitat would be prioritized for protection within the East San Francisco Bay core recovery area  
20 as described in the *Recovery Plan for the California Red-Legged Frog* (U.S. Fish and Wildlife  
21 Service 2002:51), at a location subject to USFWS approval.

### 22 **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for** 23 **Construction**

24 See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

### 25 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 26 **Resources from Maintenance Activities**

27 See description of Mitigation Measure BIO-2b under Impact BIO-2.

### 28 **Mitigation Measure BIO-22b: Avoid and Minimize Operational Traffic Impacts on Wildlife**

29 See description of Mitigation Measure BIO-22b under Impact BIO-22.

### 30 **Mitigation Measure BIO-24a: Avoid and Minimize Impacts on California Red-Legged Frog** 31 **and Critical Habitat**

#### 32 ***All Project Alternatives***

33 The following measures for California red-legged frog will only be required for construction  
34 activities occurring within suitable habitat as identified from the habitat modeling and by  
35 additional assessments conducted during the planning for work in a given area.

36 To the extent practicable, DWR will minimize impacts on critical habitat for California red-  
37 legged frog containing the primary constituent elements listed below.

- 1 1. Aquatic Breeding Habitat. Standing bodies of fresh water (with salinities less than 4.5 parts  
2 per thousand [ppt]), including: natural and human-made (e.g., stock) ponds, slow-moving  
3 streams or pools within streams, and other ephemeral or permanent waterbodies that  
4 typically become inundated during winter rains and hold water for a minimum of 20 weeks  
5 in all but the driest of years.
- 6 2. Non-Breeding Aquatic Habitat. Freshwater pond and stream habitats, as described above,  
7 that may or may not hold water long enough for the species to complete its aquatic life cycle  
8 but that do provide for shelter, foraging, predator avoidance, and aquatic dispersal for  
9 juvenile and adult California red-legged frogs. Other wetland habitats that would be  
10 considered to meet these criteria include, but are not limited to: plunge pools within  
11 intermittent creeks, seeps, quiet water refugia during high water flows, and springs of  
12 sufficient flow to withstand short-term dry periods.
- 13 3. Upland Habitat. Upland areas adjacent to or surrounding breeding and non-breeding aquatic  
14 and riparian up to a distance of 1 mile in most cases (i.e., depending on surrounding  
15 landscape and dispersal barriers) including various vegetational series such as grassland,  
16 woodland, forest, wetland, or riparian areas that provide shelter, forage, and predator  
17 avoidance. Upland features are also essential in that they are needed to maintain the  
18 hydrologic, geographic, topographic, ecological, and edaphic features that support and  
19 surround the aquatic, wetland, or riparian habitat. These upland features contribute to the  
20 filling and drying of the wetland or riparian habitat and are responsible for maintaining  
21 suitable periods of pool inundation for larval frogs and their food sources, and provide  
22 breeding, non-breeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g.,  
23 shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas  
24 for predator avoidance). Upland habitat can include structural features such as boulders,  
25 rocks and organic debris (e.g., downed trees, logs), as well as small mammal burrows and  
26 moist leaf litter.
- 27 4. Dispersal Habitat. Accessible upland or riparian habitat within and between occupied or  
28 previously occupied sites that are located within 1 mile of each other, and that support  
29 movement between such sites. Dispersal habitat includes various natural habitats and  
30 altered habitats such as agricultural fields, which do not contain barriers to dispersal.  
31 Dispersal habitat does not include moderate- to high-density urban or industrial  
32 developments with large expanses of asphalt or concrete, nor does it include large lakes or  
33 reservoirs over 50 acres in size, or other areas that do not contain those features identified  
34 in primary constituent elements 1, 2, or 3 as essential to the conservation of the species.

35 During project implementation and prior to project construction, DWR will implement the  
36 following measures.

- 37 5. When each site is available for surveys, biologist approved by USFWS, will then delineate  
38 California red-legged frog habitat at each project site, based on an agreed-upon definition of  
39 suitable habitat, including both aquatic and upland habitat.
- 40 6. Once habitat has been delineated, the qualified biologist may conduct surveys performed  
41 using a method approved by USFWS to determine presence of the species on the project site  
42 to enable further determination of compensatory mitigation requirements. In the event of a  
43 dry year, the aquatic habitat will be evaluated based on general suitability (e.g., evidence of  
44 suitable ponding depths, proximity to occurrences) and the habitat will be assumed to  
45 represent occupied habitat.



- 1           7. To the greatest extent possible, identified and delineated habitat will be completely avoided.  
2           For areas verified as being suitable for California red-legged frog and that can't be avoided, the  
3           following measures will be implemented.
- 4           8. To the extent practicable, initial ground-disturbing activities will not be conducted between  
5           September 1 and April 30, to avoid the wet season which encompasses breeding as well as  
6           potential upland migration before and after. Once the area has been surveyed, initial ground  
7           disturbance has occurred, and exclusionary fencing is in place, the seasonal restriction  
8           would not apply.
- 9           9. Ground-disturbing activities will be designed to minimize or eliminate effects on rodent  
10          burrows that may provide suitable cover habitat for California red-legged frog. Surface-  
11          disturbing activities will avoid areas with a high concentration of burrows to the greatest  
12          extent practicable. In addition, when a concentration of burrows is present in a work site,  
13          the area will be staked or flagged to ensure that work crews are aware of their location and  
14          to facilitate avoidance of the area.
- 15          10. All initial ground disturbance or vegetation removal (clearing) will be limited to periods of  
16          no or low rainfall (less than 0.08 inch per 24-hour period and less than 40% chance of rain).  
17          To the extent practicable, clearing activities within California red-legged frog habitat will  
18          cease 24 hours prior to a 40% or greater forecast of rain from the closest NWS weather  
19          station. Clearing may continue 24 hours after the rain ceases, if no more than 0.5 inch of  
20          precipitation is in the 72-hour forecast. If clearing must continue when rain is forecast (i.e.,  
21          greater than 40% chance of rain), a USFWS-approved biologist will survey the work site  
22          before clearing begins each day rain is forecast. If rain exceeds 0.5 inch during a 24-hour  
23          period, clearing will cease until the NWS forecasts no further rain. Modifications to this  
24          timing may be approved by USFWS based on site conditions and expected risks to California  
25          red-legged frog. For a given site that has exclusion fencing in place and all surface soil  
26          disturbance completed (i.e., no burrows present), these restrictions would no longer apply.
- 27          11. To the maximum extent practicable, nighttime construction will be minimized or avoided  
28          when working in suitable California red-legged frog habitat. To the greatest extent  
29          practicable, earthmoving and construction activities will cease no less than 30 minutes  
30          before sunset and will not begin again prior to no less than 30 minutes after sunrise. Except  
31          when necessary for driver or pedestrian safety, artificial lighting at a work site will be  
32          prohibited during the hours of darkness when working in suitable California red-legged frog  
33          habitat.
- 34          12. If work must be conducted at night within 300 feet of California red-legged frog habitat, all  
35          lighting will be directed away and shielded from California red-legged frog habitat outside  
36          the construction area to minimize light spillover to the greatest extent possible. If light  
37          spillover into adjacent California red-legged frog habitat occurs, a USFWS-approved  
38          biologist will be present during night work to survey for California red-legged frogs in areas  
39          illuminated by construction lighting. If California red-legged frog is found to be illuminated,  
40          the USFWS-approved biologist has the authority to terminate the project activities until the  
41          light is directed away from the frog's location, or the California red-legged frog moves out of  
42          the illuminated area.
- 43          13. At least 15 days prior to any ground disturbance activities, DWR will prepare and submit a  
44          relocation plan for USFWS's written approval. The relocation plan will contain the name(s)

- 1 of the USFWS-approved biologist(s) to relocate California red-legged frogs, the method of  
2 relocation (if different than described), a map, and a description of the proposed release  
3 site(s) within 300 feet of the work area or at a distance otherwise agreed to by USFWS, and  
4 written permission from the landowner to use their land as a relocation site
- 5 14. The perimeter of construction sites will be fenced with fencing material suitable for  
6 excluding amphibians by no more than 14 days prior to the start of construction. The  
7 construction manager and the USFWS-approved biologist will determine where exclusion  
8 fencing will be installed to protect California red-legged frog habitat adjacent to the defined  
9 site footprint and to minimize the potential for California red-legged frog to enter the  
10 construction work area. The placement of exclusion fencing will be determined, in part, by  
11 the locations of suitable habitat for the species. A conceptual fencing plan will be submitted  
12 to USFWS prior to the start of construction and the California red-legged frog exclusion  
13 fencing will be shown on the final construction plans. DWR will include the amphibian  
14 exclusion fence specifications including installation and maintenance criteria in the bid  
15 solicitation package special provisions. The amphibian exclusion fencing will remain in place  
16 for the duration of construction and will be regularly inspected and fully maintained. The  
17 biological monitor and construction manager will be responsible for checking the exclusion  
18 fencing around the work areas each day of construction for wildlife trapped inside and to  
19 ensure that they are intact and upright. This will be especially critical during times of  
20 inclement weather that can damage the fencing. Repairs to the amphibian exclusion fence  
21 will be made within 24 hours of discovery of a breach. Where construction access is  
22 necessary, gates will be installed in the exclusion fence and fencing will direct animals away  
23 from the work area to the extent practicable (e.g., fencing will flare out and turn back  
24 toward suitable habitat).
- 25 15. Preconstruction surveys will be conducted by a USFWS-approved biologist immediately  
26 prior to the initiation of any ground-disturbing activities or vegetation clearing, including  
27 immediately prior to exclusion fence installation, in areas identified as having suitable  
28 California red-legged frog habitat. These surveys will consist of walking the work site limits.  
29 The USFWS-approved biologist will investigate all potential areas that could be used by the  
30 California red-legged frog for feeding, breeding, sheltering, movement, or other essential  
31 behaviors. If there is a lapse in construction in a work area for 7 days or more, these surveys  
32 will be repeated before activities resume.
- 33 16. The USFWS-approved biologist will conduct clearance surveys at the beginning of each day  
34 and regularly throughout the workday when construction activities are occurring that may  
35 result in take of California red-legged frog. These surveys will consist of walking surveys  
36 within the work sites and investigating suitable aquatic and upland habitat including  
37 potential refugia habitat such as small woody debris, refuse, and burrow entrances, that are  
38 not directly disturbed by project activities.
- 39 17. If a California red-legged frog is encountered at any point within a work area, activities in  
40 the vicinity of the animal will cease immediately and the construction manager and  
41 biological monitor will be notified. The frog will be allowed to leave the area of its own  
42 volition, and work may resume when it is no longer in harm's way. All personnel on-site will  
43 be notified of the finding and at no time will work occur in the vicinity of the frog without a  
44 USFWS-approved biologist present. If the frog does not move out of the area on its own, and  
45 it is determined by the USFWS-approved biologist that relocating the frog is necessary, these  
46 steps will be followed:

- 1 a. Prior to handling and relocation, the biologist will take precautions to prevent  
2 introduction of amphibian diseases by following guidance in *The Declining Amphibian*  
3 *Task Force Fieldwork Code of Practice* (U.S. Fish and Wildlife Service 2019:1), or the most  
4 up-to-date guidance available at that time. California red-legged frogs will also be  
5 handled and assessed according to the *Restraint and Handling of Live Amphibians* (U.S.  
6 Geological Survey National Wildlife Health Center 2001), or the most up-to-date  
7 guidance available at that time.
- 8 b. California red-legged frogs will be captured by hand, dipnet, or other USFWS-approved  
9 methodology, transported, and relocated to nearby suitable habitat outside of the work  
10 area and released as soon as practicable the same day of capture per the relocation plan.  
11 Holding/transporting containers and dipnets will be thoroughly cleaned, disinfected,  
12 and rinsed with fresh water prior to use within construction areas. USFWS will be  
13 notified within 24 hours of all capture, handling, and relocation efforts. USFWS-  
14 approved biologists will wear clean, new disposable surgical style (latex, nitrile, etc.)  
15 gloves and/or ensure that their hands are free of soaps, oils, creams, lotions, repellents,  
16 or solvents of any sort while capturing and relocating individuals. To avoid transferring  
17 disease or pathogens in handling of the amphibians, USFWS-approved biologists will  
18 follow the Declining Amphibian Populations Task Force’s “Code of Practice” or the most  
19 up to date, agency-accepted guidance.
- 20 c. If an injured California red-legged frog is encountered and the USFWS-approved  
21 biologist determines the injury is minor or healing and the frog is likely to survive, the  
22 frog will be released immediately, consistent with the preapproved relocation plan as  
23 described above. The frog will be monitored until it is determined that it is not  
24 imperiled by predators or other dangers.
- 25 d. If the USFWS-approved biologist determines that the frog has major or serious injuries  
26 because of activities at the work site, the USFWS-approved biologist, or designee, will  
27 immediately take it to a USFWS-approved facility. If taken into captivity, the individual  
28 will not be released into the wild unless it has been kept in quarantine and the release is  
29 authorized by USFWS. DWR will bear any costs associated with the care or treatment of  
30 such injured frogs. The circumstances of the injury, the procedure followed, and the final  
31 disposition of the injured animal will be documented in a written incident report.  
32 Notification to USFWS of an injured or dead California red-legged frog in the project  
33 area will be reported within 24 hours and will include details such as whether or not its  
34 condition resulted from activities related to the proposed project. In addition, the  
35 USFWS-approved biologist will follow up with USFWS in writing within 2 calendar days  
36 of the finding. Written notification to USFWS will include the following information: the  
37 species, number of animals taken or injured, sex (if known), date, time, location of the  
38 incident or of the finding of a dead or injured animal, how the individual was taken,  
39 photographs of the specific animal, the names of the persons who observed the take or  
40 found the animal, and any other pertinent information. Dead specimens will be  
41 preserved, as appropriate, and held in a secure location until instructions are received  
42 from USFWS regarding the disposition of the specimen.
- 43 18. Work within suitable aquatic habitats will not begin until the habitat is dry or has been  
44 adequately surveyed and dewatered. Aquatic habitats that must be dewatered will be  
45 surveyed for California red-legged frogs prior to dewatering. Dewatering pumps will be  
46 screened with wire mesh not larger than 5 millimeters to prevent larvae from entering the

1 pump. The biological monitor will be present during dewatering. Any California red-legged  
2 frogs found will be relocated per the relocation plan.

3 **Mitigation Measure BIO-24b: Compensate for Impacts on California Red-Legged Frog**  
4 **Habitat Connectivity**

5 ***All Project Alternatives***

6 To mitigate for impacts on California red-legged frog habitat connectivity resulting from the  
7 construction of the access roads and rail spur leading to the Southern Forebay (Alternatives 1,  
8 2a, 2b, 2c, 3, 4a, 4b, and 4c) and the construction of a new crossing on Mountain House Creek, a  
9 widened section of Byron Highway crossing over an unnamed channel near the new Lindemann  
10 Road interchange (Alternative 5), and a widened section of Mountain House Road over two  
11 unnamed creeks, DWR will design and construct crossings (i.e., culverts or bridges) on Brushy  
12 Creek, Italian Slough, Mountain House Creek, and the unnamed channels crossing Byron  
13 Highway and Mountain House Road that meet the following performance standards.

- 14 1. Completely span suitable California red-legged frog aquatic habitat.
- 15 2. Maintain natural channel substrates, or similar materials, at road and rail spur crossings  
16 over California red-legged frog habitat.
- 17 3. Size the constructed crossings to include upland habitat on at least one side of each channel  
18 that is above the bank full width to allow for terrestrial movement and refugia from bank  
19 full flows.

20 New and widened road segments will be designed and constructed on the new access road to  
21 Bethany Reservoir, Byron Highway, Mountain House Road, Grant Line Road, and Lindemann  
22 Road with the following features:

- 23 4. New and widened access road segments will avoid installing curbs, to the extent practicable.  
24 If curbs must be installed, curbs will be designed with sloping sides less than 30 degrees  
25 (Clevenger and Huijser 2011:156) to allow amphibian movement across the road.
- 26 5. New and widened access road segments will avoid installing median barriers (i.e., k-rails), to  
27 the extent practicable. If median barriers cannot be avoided due to public safety concerns,  
28 barriers will be outfitted with small openings at ground level to allow amphibian passage.

29 ***Mitigation Impacts***

30 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
31 mitigation measure impacts. The analyses below consider the potential impacts associated with  
32 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
33 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
34 *Measures*.

35 **Compensatory Mitigation**

36 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
37 species at the I-5 ponds and on Bouldin Island, and tidal wetland habitat restoration and channel  
38 margin enhancement locations (Appendix 3F, Section 3F.4.3.4.2) under the project's CMP would not

1 affect modeled habitat for California red-legged frog because these activities are outside of the  
2 known range of the species.

3 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
4 enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in the temporary  
5 disturbance of existing habitat and the potential for injury or mortality of California red-legged frog  
6 if these activities take place in areas of suitable upland habitat for the species. Site-specific analyses  
7 are not provided because locations of potential non-bank sites are not currently known.

8 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
9 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
10 management of agricultural areas but may also include natural communities in the study area  
11 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
12 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
13 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
14 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas would not likely include habitat for  
15 California red-legged frog and therefore the species would not likely be affected. Site-specific  
16 analyses are not provided because locations of potential site protection instruments are not  
17 currently known.

18 The impact on California red-legged frog from the project alternatives with the CMP would be less  
19 than significant with mitigation.

#### 20 Other Mitigation Measures

21 Some mitigation measures would involve ground disturbance and the use of heavy equipment that  
22 would have the potential to result in loss of modeled California red-legged frog habitat or result in  
23 injury, mortality, and disruption of normal behaviors of California red-legged frog adults, larvae, or  
24 eggs from ground disturbance, noise, vibration, or inadvertent discharge of construction-related  
25 sediment or fluids such as fuels, oils, and cement. The mitigation measures with potential to result in  
26 impacts on California red-legged frog are similar to those discussed under Impact BIO-22: *Impacts of*  
27 *the Project on California Tiger Salamander*. The impacts of habitat loss, ground disturbance, noise,  
28 visual disturbance, and exposure to sediment or hazardous materials on California red-legged frog  
29 would be reduced through the CMP and environmental commitments as detailed under Impact BIO-  
30 22. Impacts on California red-legged frog resulting from implementation of mitigation measures  
31 would be similar to construction effects of the project alternatives in certain construction areas and  
32 would contribute to California red-legged frog impacts of the project alternatives.

33 The impacts of habitat loss, ground disturbance, noise, visual disturbance, and exposure to sediment  
34 or hazardous materials on California red-legged frog would be reduced through the CMP and  
35 environmental commitments as detailed under Impact BIO-22. In addition, Mitigation Measure BIO-  
36 24a: *Avoid and Minimize Impacts on California Red-Legged Frog* would require species-specific  
37 measures to reduce these impacts. Therefore, impacts on California red-legged frog from  
38 implementation of other mitigation measures would be reduced to less than significant.

39 Overall, the impacts on California red-legged frog from construction of compensatory mitigation and  
40 implementation of other mitigation measures, combined with project alternatives, would not change  
41 the impact conclusion from less than significant with mitigation.

## 1 **Impact BIO-25: Impacts of the Project on Western Pond Turtle**

2 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
 3 information on the species life history and habitat suitability model for western pond turtle are  
 4 presented in the species account in Appendix 13B, Section 13B.50, *Western Pond Turtle*.

### 5 ***All Project Alternatives***

#### 6 ***Construction***

7 The construction of all the project alternatives would result in the permanent and temporary loss of  
 8 western pond turtle modeled habitat from project related grading and excavation (Table 13-62).  
 9 The loss of habitat would primarily occur as a result of the levee improvement work (Alternatives 1,  
 10 2a, 2b, and 2c), Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c), new roads and road  
 11 improvements (all alternatives), and the intake construction (all alternatives) (Appendix 13C). The  
 12 central alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would result in greater impacts on  
 13 modeled habitat relative to the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and  
 14 the Bethany Reservoir alignment (Alternative 5) largely because of the levee improvements on  
 15 Bouldin Island and road improvements throughout the central alignment. Environmental  
 16 Commitment EC-14: *Construction Best Management Practices for Biological Resources* would ensure  
 17 that temporarily disturbed areas are restored (Appendix 3B).

18 **Table 13-62. Impacts on Modeled Habitat for Western Pond Turtle by Alternative**

Alternative	Permanent Impacts— Aquatic (acres) <sup>a</sup>	Permanent Impacts— Upland (acres) <sup>a</sup>	Temporary Impacts— Aquatic (acres)	Temporary Impacts— Upland (acres)	Total (acres)
1	95.65	388.65	34.71	109.01	628.02
2a	92.06	448.94	41.08	124.89	706.97
2b	81.69	349.13	39.92	121.21	591.95
2c	86.97	367.86	40.89	123.53	619.25
3	79.68	131.65	25.55	75.11	311.99
4a	84.36	207.88	25.77	76.72	394.73
4b	71.61	107.78	24.59	73.05	277.03
4c	77.08	126.79	25.57	75.35	304.79
5	33.76	109.56	16.45	48.34	208.11

19 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 20 discussion in Section 13.3.1.2.  
 21

22 Construction activities associated with project facilities for all alternatives could result in the injury  
 23 and mortality of western pond turtle if they are occupying aquatic or upland habitat in work areas  
 24 during activities such as grading, excavation, vegetation removal, and the use of construction-related  
 25 vehicles. Western pond turtle could also be trapped in open trenches or other excavations and  
 26 become vulnerable to predation. Construction activities could also result in the exposure of western  
 27 pond turtle to construction-related fluids, such as fuels, oils, and cement, which could result in the  
 28 injury and mortality of eggs, hatchlings, and adults. Construction noise and vibration could also  
 29 disrupt normal behaviors and result in increased energy expenditures and predation risk. The use of  
 30 tunnel boring machines during construction would potentially cause groundborne vibration in the

1 immediate vicinity of tunnel construction areas. However, because of the depth at which the tunnel  
2 would be constructed, and because the deep soil cover over the tunnel would effectively dampen  
3 and absorb propagated energy from the tunnel crown and the tunnel floor, no significant noise and  
4 vibration effects from the operation of the tunnel boring machine on western pond turtle are  
5 anticipated (Chapter 24, Section 24.4.3.2). Environmental Commitments EC-1: *Conduct Worker*  
6 *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
7 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
8 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these  
9 potential impacts by (1) training construction staff on protecting sensitive biological resources,  
10 reporting requirements, and the ramifications for not following these measures; (2) implementing  
11 spill prevention and containment plans that would avoid material spills that could affect the viability  
12 of nearby aquatic and upland habitat; and (3) having a biological monitor present to ensure that  
13 non-disturbance buffers and associated construction fencing are intact and all other protective  
14 measures are being implemented, where applicable.

15 Six CNDDDB occurrences of western pond turtle would overlap with the project alternatives  
16 (California Department of Fish and Wildlife 2020a). The emergency spillway on the Southern  
17 Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) overlaps with an occurrence (#143) at the  
18 northern end of Clifton Court Forebay. The levee and road improvements on Bouldin Island  
19 associated with the central alignment alternatives (Alternatives 1, 2a, 2b, and 2c) overlap with three  
20 occurrences (#164, #187, and #247) along the existing levees and along SR 12. SCADA  
21 improvements along SR 12 for all alternatives overlap with an occurrence (#68). Road  
22 improvements for all alternatives and RTM construction and a shaft for Alternative 5 overlap with  
23 an occurrence (#451).

24 Field investigations for all project alternatives would be conducted prior to and during construction  
25 to more specifically identify appropriate construction methods and design criteria addressed in the  
26 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
27 and address the establishment of geological and groundwater monitoring programs (Delta  
28 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
29 variety of ground-disturbing activities that would vary in duration from several hours to  
30 approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
31 Construction Authority 2022a, 2022b) could result in impacts on habitat and the potential for injury,  
32 mortality, and the disruption of normal behaviors of western pond turtle. Geotechnical  
33 investigations that would occur in the West Tracy Fault Study area and over the tunnel alignment  
34 footprints, which include test trenches, CPTs, soil borings, and geophysical arrays, would result in  
35 temporary impacts on modeled habitat (Appendix 13C). The Bethany Fault Study investigations  
36 would not affect modeled western pond turtle habitat. The following field investigations would be  
37 conducted within proposed surface construction footprints of project facilities (including portions of  
38 tunnel alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT,  
39 groundwater testing and monitoring, monument installation, pilot studies for settlement, agronomic  
40 testing, and utility potholing. These temporary impacts are not characterized as an additional loss of  
41 habitat because impacts for these locations have already been quantified within the construction  
42 footprints but could still result in the potential for injury, mortality, and the disruption of normal  
43 behaviors of western pond turtle, as discussed above for conveyance facility construction.  
44 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
45 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
46 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*

1 *Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training  
2 construction staff on protecting sensitive biological resources, reporting requirements, and the  
3 ramifications for not following these measures; (2) implementing spill prevention and containment  
4 plans that would avoid material spills that could affect the viability of nearby aquatic and upland  
5 habitat; and (3) having a biological monitor present to ensure that non-disturbance buffers and  
6 associated construction fencing are intact and all other protective measures are being implemented,  
7 where applicable.

### 8 Operations

9 All project alternatives have the potential for operational impacts on western pond turtle from  
10 vehicles and from changes to water quality. Western pond turtles moving across access roads could  
11 be struck by vehicles resulting in injury and mortality. Trips on any given access roads to DWR  
12 facilities would be relatively infrequent but do pose a risk to the species where roads occur between  
13 aquatic and upland habitats.

14 Changes in water operations under all project alternatives have the potential to exacerbate  
15 bioaccumulation of methylmercury in western pond turtle. Although the magnitude of  
16 methylmercury bioaccumulation differs among species, largemouth bass was used as a surrogate  
17 species for analysis of impacts from changes in operations of the water conveyance facilities because  
18 they are good indicators of mercury contamination in aquatic foodwebs throughout the Delta (Wood  
19 et al. 2010: 67) and would reflect changes in methylmercury bioavailability due to the project  
20 (Appendix 9H, *Mercury*). The modeled effects of mercury concentrations from changes in water  
21 operations on largemouth bass did not differ substantially from existing conditions; therefore, these  
22 results also indicate western pond turtle mercury exposure would not measurably increase as a  
23 result of project operations.

24 Microcystin toxins originate in aquatic systems and can be transported through foodwebs through  
25 consumption (Moy et al. 2016:A) and can affect western pond turtle if they forage in aquatic habitats  
26 with conditions that promote formation of cyanobacterial harmful algal blooms (CHABs). Operation  
27 of all project alternatives is not expected to substantially change the five factors that could create  
28 conditions more conducive to CHAB formation (i.e., temperature, residence time, nutrients, water  
29 velocities and associated turbulence and mixing, and water clarity and associated irradiance)  
30 relative to existing conditions upstream of the Delta, within the Delta, or in Suisun Marsh, Suisun  
31 Bay, or San Francisco Bay (Chapter 9, *Water Quality*). The water quality modeling results show a  
32 potential for increased residence time in some locations and months within the central Delta,  
33 namely Discovery Bay where there are already very long residence times, which could contribute to  
34 increased *Microcystis* bloom size in some years at these locations if the remaining four  
35 environmental factors are also at levels conducive to forming CHABs. Nevertheless, based on known  
36 *Microcystis* dynamics in the Delta, a small increase of residence time at Discovery Bay would not  
37 cause *Microcystis* blooms to substantially increase in size or last substantially longer, relative to  
38 existing conditions. Because the project alternatives, through their effects on the five factors  
39 potentially associated with CHABs in the Delta, are not expected to cause Delta CHABs to be  
40 substantially larger in size, and because bloom size does not necessarily dictate toxin concentration  
41 in the water, the project alternatives are not expected to substantially increase microcystin or any  
42 other cyanotoxins in the Delta that could cause a substantial adverse impact on western pond turtle,  
43 relative to existing conditions.



1 Current use and legacy pesticides have the potential to bioaccumulate in the food items of western  
2 pond turtle. Operation of all project alternatives and potential runoff from project facilities would  
3 not result in substantial increases in pesticide concentrations in Delta waters or in Delta outflows,  
4 and would not result in land-use changes that would increase use of pesticides in habitats used by  
5 western pond turtles, relative to existing conditions. Therefore, the project alternatives would not  
6 substantially reduce prey populations or increase pesticide exposure to western pond turtle.

7 Changes in water operations under all project alternatives has the potential to exacerbate  
8 bioaccumulation of selenium in western pond turtle. Modeled selenium concentrations in fish tissue,  
9 used as a surrogate, were below the level of concern and did not differ substantially from existing  
10 conditions under all alternatives (Appendix 9J, *Selenium*), which suggests that selenium exposure to  
11 western pond turtles would also not change. Therefore, the project alternatives are not anticipated  
12 to substantially increase the risk of selenium contamination in western pond turtle.

### 13 Maintenance

14 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
15 in impacts on western pond turtle. Maintenance activities across all facilities that could affect  
16 western pond turtles include repaving of access roads every 15 years, semiannual general and  
17 ground maintenance (e.g., mowing, vegetation trimming, herbicide application), and daily or weekly  
18 inspections by vehicle, and could result in the injury, mortality, and disruption of normal behaviors  
19 of western pond turtle if these activities occur adjacent to aquatic habitat or suitable upland habitat.

### 20 **CEQA Conclusion—All Project Alternatives**

21 The construction, operation, and maintenance of all project alternatives would result in impacts on  
22 western pond turtle through the permanent and temporary loss of modeled habitat and the  
23 potential for injury, mortality, and the disruption of normal behaviors. For all project alternatives,  
24 changes in water operations would not be expected to result in a measurable increase in mercury or  
25 selenium bioavailability or pesticide or microcystin exposure to western pond turtle.

26 The temporary loss of habitat and the potential impacts of injury, mortality, and the disruption of  
27 normal behaviors of western pond turtle from project construction would be reduced by  
28 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
29 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
30 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
31 *Biological Resources* (Appendix 3B). Even with these commitments, however, the permanent loss of  
32 habitat from the construction of the alternatives and the potential for injury, mortality, and  
33 disruption of normal behaviors from construction, operations, and maintenance on western pond  
34 turtle would be significant. Implementation of the CMP would offset the loss of western pond turtle  
35 habitat through the creation and protection of suitable aquatic habitat, which would include  
36 freshwater emergent wetland and open water habitat, and upland habitat, which would include  
37 grassland and riparian, on Bouldin Island and at the I-5 ponds (Appendix 3F, Sections 3F.4.1.3 and  
38 3F.4.1.4). Future channel margin enhancement and tidal wetland habitat (Appendix 3F, Section  
39 3F.4.3) would also provide habitat for western pond turtle. These actions described in the CMP  
40 would reduce the habitat loss impact to a less-than-significant level. Mitigation Measures BIO-2b:  
41 *Avoid and Minimize Impacts on Terrestrial Biological Resources from Maintenance Activities*, BIO-22b:  
42 *Avoid and Minimize Operational Traffic Impacts on Wildlife*, and BIO-25: *Avoid and Minimize Impacts*  
43 *on Western Pond Turtle* would be required to avoid and minimize the potential for injury, mortality,

1 disruption of normal behaviors, and disturbances to habitat. The impacts on western pond turtle  
2 from the project alternatives would be less than significant with mitigation because these  
3 aforementioned measures would replace lost habitat and reduce direct effects on the species,  
4 including habitat disturbance, by avoiding construction and maintenance activities in and adjacent  
5 to habitat to the extent possible; timing construction activities, installing exclusion fencing,  
6 conducting preconstruction surveys, and other protective measures to avoid and minimize the  
7 potential for injury and mortality; and by putting in place traffic control measures at DWR facilities  
8 during operations to minimize the potential for vehicle strikes.

### 9 **Mitigation Measure CMP: Compensatory Mitigation Plan**

10 DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to  
11 offset the loss of western pond turtle habitat through creation and protection of suitable aquatic  
12 habitat, which would include freshwater emergent wetland and open water habitat, and upland  
13 habitat, which would include grassland and riparian, on Bouldin Island and at the I-5 ponds  
14 (Appendix 3F, Sections 3F.4.1.3 and 3F.4.1.4). Future channel margin enhancement and tidal  
15 wetland habitat (Appendix 3F, Section 3F.4.3) would also provide habitat for western pond  
16 turtle.

### 17 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 18 **Resources from Maintenance Activities**

19 See description of Mitigation Measure BIO-2b under Impact BIO-2.

### 20 **Mitigation Measure BIO-22b: Avoid and Minimize Operational Traffic Impacts on Wildlife**

21 See description of Mitigation Measure BIO-22b under Impact BIO-22.

### 22 **Mitigation Measure BIO-25: Avoid and Minimize Impacts on Western Pond Turtle**

#### 23 ***All Project Alternatives***

24 The following measures for western pond turtle will only be required for project construction  
25 occurring within or adjacent to suitable habitat as identified from the habitat modeling and by  
26 planning level assessments conducted once access to the project footprint is available. A  
27 qualified biologist will conduct a field evaluation of suitable upland or aquatic habitat for  
28 western pond turtles for all project activities that occur within modeled habitat.

29 If the project does not fully avoid effects on suitable habitat, the following measures will be  
30 required.

- 31 1. No more than 14 days prior to the start of construction activities in a given area, exclusion  
32 fencing will be installed between the work area and adjacent suitable aquatic habitat. Where  
33 openings need to be maintained, such as on the levee road, fencing will be installed to direct  
34 turtles away from the work area to the extent practicable (e.g., fencing will flare out and turn  
35 back toward the river and adjacent riparian). Fencing will be installed prior to the start of  
36 the nesting season (March) and remain in place for the duration of construction. Fencing  
37 may be moved or reconfigured to facilitate construction. The biological monitor and  
38 construction manager will be responsible for checking the exclusion fencing around the  
39 work areas each day of construction to ensure that they are intact and upright. Repairs to  
40 the exclusion fence will be made within 24 hours of discovery of damage. Where

- 1 construction access is necessary, gates will be installed in the exclusion fence and fencing  
2 will direct animals away from the work area to the extent practicable (e.g., fencing will flare  
3 out and turn back toward suitable habitat).
- 4 2. Preconstruction surveys will be conducted by a qualified biologist immediately prior to the  
5 initiation of any ground-disturbing activities or vegetation clearing, including exclusion  
6 fence installation, in areas identified as having suitable western pond turtle habitat. If there  
7 is a lapse in construction in a work area for 7 days or more, these surveys will be repeated  
8 before activities resume.
- 9 3. The qualified biologist will conduct clearance surveys at the beginning of each day and  
10 regularly throughout the workday when construction activities are occurring that may  
11 result in take of western pond turtle. If a turtle is observed, the qualified biologist will  
12 implement the following species observation and handling protocol. Only qualified  
13 biologists will participate in activities associated with the capture, handling, and monitoring  
14 of western pond turtles. If a turtle is encountered in a construction area, activities within the  
15 vicinity of the individual will cease immediately, and the construction manager and qualified  
16 biologist will be notified. The turtle will be allowed to leave the area of its own volition, and  
17 work may resume when it is no longer in harm's way. All personnel on-site will be notified  
18 of the finding and at no time will work occur in the vicinity of the turtle without a qualified  
19 biologist present. If the turtle does not move out of the area on its own, and it is determined  
20 by the qualified biologist that relocating the turtle is necessary, relocation will be done in  
21 coordination with CDFW. Any handling of turtles will be done by a biologist with a valid  
22 memorandum of understanding from CDFW authorizing the capture and relocation of  
23 turtles and as determined during coordination with CDFW. Biologists will wear clean, new  
24 disposable surgical style (nitrile, etc.) gloves while handling and relocating individuals.
- 25 4. If a work site is to be temporarily dewatered by pumping, intakes will be completely  
26 screened with wire mesh not larger than 5 millimeters to prevent juvenile pond turtle and  
27 other aquatic species from entering the pump system. Any turtles found in the dewatered  
28 area will be relocated in coordination with CDFW to the nearest aquatic habitat by a  
29 biologist authorized to relocate turtles.

### 30 ***Mitigation Impacts***

31 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
32 mitigation measure impacts. The analyses below consider the potential impacts associated with  
33 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
34 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
35 *Measures*.

### 36 ***Compensatory Mitigation***

37 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
38 species at the I-5 ponds and on Bouldin Island under the project's CMP would affect modeled habitat  
39 for western pond turtle (Appendix 13C) from vegetation removal and grading to create the  
40 appropriate topography and soil conditions to establish/restore habitats. The CMP could also affect  
41 modeled habitat through tidal wetland habitat restoration and channel margin enhancement  
42 because potential areas identified generally overlap with modeled habitat (Appendix 3F, Section  
43 3F.4.3.4.2).

1 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
2 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
3 vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located, which are  
4 not habitats for western pond turtle; therefore, there would not likely be any effects on this species.  
5 Site-specific analyses are not provided because locations of potential non-bank sites are not  
6 currently known.

7 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
8 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
9 management of agricultural areas but may also include natural communities in the study area  
10 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
11 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
12 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
13 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could potentially contain habitat for  
14 western pond turtle and management activities could affect this habitat and result in the disruption  
15 of normal behaviors, injury, and mortality. Site-specific analyses are not provided because locations  
16 of potential protection instruments are not currently known.

17 The CMP and site-specific permitting approvals would ensure that there is no significant loss in  
18 habitat or habitat value by adjusting the overall commitment (Appendix 3F, Section 3F.1, Section  
19 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General Design Guidelines*) and therefore reduce  
20 any habitat losses associated with the CMP to a less-than-significant level. These activities would  
21 also have the potential for injury, mortality, and the disruption of normal behaviors of individuals.  
22 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-3: *Develop and*  
23 *Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best*  
24 *Management Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts  
25 to a less-than-significant level by (1) training construction staff on protecting sensitive biological  
26 resources, reporting requirements, and the ramifications for not following these measures; (2)  
27 implementing spill prevention and containment plans that would avoid material spills that could  
28 affect the viability of nearby aquatic and upland habitat; and (3) having a biological monitor present  
29 to ensure that non-disturbance buffers and associated construction fencing are intact and all other  
30 protective measures are being implemented where applicable.

31 Creation and enhancement of wetlands and other waters under the CMP have the potential to  
32 exacerbate bioaccumulation of methylmercury in western pond turtle by creating newly inundated  
33 wetlands which can produce the biogeochemical conditions to methylate mercury existing in Delta  
34 soils. Because Bouldin Island and the I-5 ponds sites consist of existing managed and agricultural  
35 wetlands and ponds, wetland creation and enhancement are not expected to increase mercury  
36 methylation, relative to existing conditions. Monitoring and adaptive management plans as  
37 described in the CMP (Appendix 3F, Section 3F.7.2, *Monitoring*) would include mercury monitoring  
38 and adaptive management at Bouldin Island and the I-5 ponds to prevent increased mercury  
39 methylation, relative to existing conditions. Mitigation Measure WQ-6: *Develop and Implement a*  
40 *Mercury Management and Monitoring Plan*, which contains measures to assess the amount of  
41 mercury at tidal restoration sites before project development, followed by appropriate design and  
42 adaptive management, would minimize the potential for any effects of increased methylmercury  
43 exposure due to tidal restoration. Therefore, implementation of the CMP would not be expected to  
44 have a significant adverse impact on western pond turtle.

1 Habitat creation and enhancement under the CMP has the potential to result in conditions that  
2 promote CHABs, which could result in impacts on western pond turtle using created and/or  
3 enhanced wetland and aquatic habitats. High levels of microcystins in tissues and microcystin  
4 poisoning have been documented in other turtle species using other aquatic habitats (Chen et al.  
5 2009:3317) and could affect western pond turtle if they forage in areas with conditions that  
6 promote CHABs. Monitoring and adaptive management plans as described in the CMP (Appendix 3F,  
7 Section 3F.7.2) would include CHAB monitoring and adaptive management at Bouldin Island and the  
8 I-5 ponds to prevent increased CHAB formation, relative to existing conditions. As discussed in  
9 Chapter 9, *Water Quality*, tidal habitat creation is not expected to cause substantial additional  
10 *Microcystis* production. Therefore, implementation of the CMP would not result in increased CHAB  
11 formation that could cause substantial adverse impacts on western pond turtle, relative to existing  
12 conditions.

13 Herbicides would be applied at CMP restoration sites to remove nonnative vegetation for site  
14 preparation and to support establishment of new plantings. Natural habitats contribute fewer  
15 pesticides to receiving waters than agricultural areas where pesticides are applied. Any newly  
16 created wetlands or enhanced natural habitat could also filter stormwater to remove solids and  
17 either improve or have no effect on pesticide concentrations in discharges to receiving waters,  
18 relative to existing conditions. As such, restoration areas are expected to somewhat reduce, rather  
19 than increase, runoff of pesticides in adjacent waterbodies. Environmental Commitment EC-14:  
20 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would ensure that  
21 herbicides would be applied in such a manner as to prevent primary or secondary poisoning of  
22 western pond turtles.

23 Wetland creation and enhancement may provide habitat for western pond turtle, which could  
24 increase the risk of selenium toxicity to the species. It is difficult to determine whether the effects of  
25 potential increases in selenium bioavailability associated with restoration activities under the CMP  
26 would lead to adverse effects. Potential effects of increased selenium exposure are likely low for  
27 western pond turtle because modeled concentrations in fish tissue and bird eggs under existing  
28 conditions in the Delta were below levels of concern (Appendix 9J), which suggests selenium  
29 concentrations in western pond turtles are similarly low and existing selenium concentrations are  
30 low in the Sacramento River watershed (Central Valley Regional Water Quality Control Board  
31 1988:14). Analysis included in Chapter 9 for Impact WQ-10 found that compensatory mitigation  
32 would not result in a measurable increase in selenium concentrations or selenium bioavailability.

33 The impact on western pond turtle from the project alternatives with the CMP would be less than  
34 significant with mitigation.

### 35 **Mitigation Measure WQ-6, Develop and Implement a Mercury Management and** 36 **Monitoring Plan**

37 See description of Mitigation Measure WQ-6 under Impact WQ-6 in Chapter 9.

### 38 *Other Mitigation Measures*

39 Some mitigation measures would involve ground disturbance and the use of heavy equipment, pile  
40 driving, or pesticides that would have the potential to result in loss of modeled western pond turtle  
41 habitat or result in injury, mortality, and disruption of normal behaviors of western pond turtle  
42 adults, hatchlings, or eggs from ground disturbance, noise, vibration, or inadvertent discharge of  
43 construction-related fluids such as fuels, oils, and cement in aquatic and upland habitat. Impacts on

1 western pond turtle resulting from implementation of mitigation measures would be similar to  
 2 construction effects of the project alternatives in certain construction areas and would contribute to  
 3 western pond turtle impacts of the project alternatives.

4 However, the impacts of habitat loss, ground disturbance, noise, vibration, and exposure to  
 5 hazardous materials on western pond turtle would be reduced through the CMP, Environmental  
 6 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
 7 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
 8 *Countermeasure Plans*; EC-14: *Construction Best Management Practices for Biological Resources*, and  
 9 Mitigation Measure BIO-25: *Avoid and Minimize Impacts on Western Pond Turtle*. Therefore, impacts  
 10 on western pond turtle from implementation of other mitigation measures would be reduced to less  
 11 than significant.

12 Overall, the impacts on western pond turtle from construction of compensatory mitigation and  
 13 implementation of other mitigation measures, combined with project alternatives, would not change  
 14 the impact conclusion of less than significant with mitigation.

### 15 **Impact BIO-26: Impacts of the Project on Coast Horned Lizard**

16 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
 17 information on the species life history and habitat suitability model for coast horned lizard are  
 18 presented in the species account in Appendix 13B, Section 13B.51, *Coast Horned Lizard*.

#### 19 ***All Project Alternatives***

##### 20 ***Construction***

21 The construction of all the project alternatives would result in the permanent and temporary loss of  
 22 coast horned lizard modeled habitat. The loss of modeled habitat would primarily occur as a result  
 23 of the levee improvement work, new roads and road improvements, and the South Delta Outlet and  
 24 Control Structure (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) (Appendix 13C). The central alignment  
 25 alternatives (Alternatives 1, 2a, 2b, and 2c) would result in greater impacts on modeled habitat  
 26 compared to the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and the Bethany  
 27 Reservoir alignment (Alternative 5) largely because of the levee improvements on Bouldin Island  
 28 and road improvements throughout the central alignment (Table 13-63). Environmental  
 29 Commitment EC-14: *Construction Best Management Practices for Biological Resources* would ensure  
 30 that temporarily disturbed areas are restored (Appendix 3B).

31 **Table 13-63. Impacts on Modeled Habitat for Coast Horned Lizard by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	241.00	46.67	287.67
2a	257.10	53.22	310.32
2b	232.22	51.84	284.06
2c	234.34	53.17	287.51
3	32.43	14.51	46.94
4a	55.36	14.57	69.93
4b	30.48	13.17	43.65
4c	32.59	14.52	47.11

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
5	19.50	20.07	39.57

<sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see discussion in Section 13.3.1.2.

Construction activities for all project alternatives could result in the injury, mortality, and disruption of feeding, breeding, and dispersal of coast horned lizard. These effects could result from project grading, excavation, the use of construction-related vehicles, and exposure of coast horned lizards to construction-related fluids, such as fuels, oils, and cement. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training construction staff on protecting sensitive biological resources, reporting requirements, and the ramifications for not following these measures; (2) implementing spill prevention and containment plans that would avoid material spills that could affect the viability of nearby habitat; and (3) having a biological monitor present to ensure that non-disturbance buffers and associated construction fencing are intact and all other protective measures are being implemented, where applicable.

There are no CNDDDB (California Department of Fish and Wildlife 2020a) occurrences of coast horned lizard in locations that would be permanently or temporarily affected by project construction for any of the alternatives. The nearest occurrence is outside of the study area, approximately 2 miles west of the project road improvements on Byron Highway.

Field investigations for all project alternatives would be conducted prior to and during construction to more specifically identify appropriate construction methods and design criteria addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities, and address the establishment of geological and groundwater monitoring programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a variety of ground-disturbing activities that would vary in duration from several hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and Construction Authority 2022a, 2022b) and could result in impacts on habitat and the potential for injury, mortality, and the disruption of normal behaviors of coast horned lizard. Geotechnical investigations that would occur in the West Tracy Fault Study area and over the tunnel alignment footprints, which include test trenches, CPTs, soil borings, and geophysical arrays, would result in temporary impacts on habitat (Appendix 13C). The Bethany Fault Study investigations would not affect modeled coast horned lizard habitat. The following field investigations would be conducted within proposed surface construction footprints of project facilities (including portions of tunnel alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT, groundwater testing and monitoring, monument installation, pilot studies for settlement, agronomic testing, and utility potholing. These temporary impacts are not characterized as an additional loss of habitat because impacts for these locations have already been quantified within the construction footprints but could still result in the potential for injury, mortality, and the disruption of normal behaviors of coast horned lizard, as discussed above for conveyance facility construction.

Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training

1 construction staff on protecting sensitive biological resources, reporting requirements, and the  
2 ramifications for not following these measures; (2) implementing spill prevention and containment  
3 plans that would avoid material spills that could affect the viability of nearby habitat; and (3) having  
4 a biological monitor present to ensure that non-disturbance buffers and associated construction  
5 fencing are intact and all other protective measures are being implemented, where applicable.

### 6 Operations

7 All project alternatives have the potential for impacts on coast horned lizard from vehicle traffic on  
8 access roads during operations at project facilities. Coast horned lizards could in particular be struck  
9 by vehicle traffic on access roads to the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and  
10 4c) and the Bethany Complex (Alternative 5) because the likelihood of the species occurring in these  
11 areas is greater than other portions of the project area; there are several occurrences for the species  
12 2 to 5 miles west of the study area (California Department of Fish and Wildlife 2020a).

### 13 Maintenance

14 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
15 in impacts on coast horned lizard. Maintenance activities across all facilities that could affect coast  
16 horned lizard include repaving of access roads every 15 years, semiannual general and ground  
17 maintenance (e.g., mowing, vegetation trimming, herbicide application), and daily or weekly  
18 inspections by vehicle, and could result in the injury, mortality, and disruption of normal behaviors  
19 (i.e., foraging, breeding, and dispersal) of coast horned lizard. Maintenance at the Southern Forebay  
20 (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) would include annual embankment repair and quarterly  
21 animal burrow filling, which could also result in the injury, mortality, and disruption of normal  
22 behaviors if coast horned lizards are present in these areas.

### 23 **CEQA Conclusion—All Project Alternatives**

24 The construction, operation, and maintenance of all project alternatives would result in impacts on  
25 coast horned lizard through the permanent and temporary loss of modeled habitat and the potential  
26 for injury, mortality, and the disruption of normal behaviors.

27 The temporary loss of habitat and the potential impacts of injury, mortality, and the disruption of  
28 normal behaviors of coast horned lizard from project construction would be reduced by  
29 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
30 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
31 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
32 *Biological Resources* (Appendix 3B). Even with these commitments, however, the permanent loss of  
33 habitat from the construction of the alternatives and the potential for injury, mortality, and  
34 disruption of normal behaviors from construction, operations, and maintenance on coast horned  
35 lizard would be significant. Implementation of the CMP would offset the loss of coast horned lizard  
36 habitat by creating and protecting grasslands on Bouldin Island (Appendix 3F, Section 3F.3.3.2) and  
37 through the protection of upland grasslands as part of California red-legged frog and California tiger  
38 salamander mitigation (Appendix 3F, Section 3F.3.3.3 and Attachment 3F.1, Table 3F.1-3), which  
39 could contain suitable habitat for coast horned lizard. Mitigation Measures BIO-2b: *Avoid and*  
40 *Minimize Impacts on Terrestrial Biological Resources from Maintenance Activities*, BIO-22b: *Avoid and*  
41 *Minimize Operational Traffic Impacts on Wildlife*, and BIO-26: *Avoid and Minimize Impacts on Special-*  
42 *Status Reptiles* would be required to avoid and minimize the potential for injury, mortality,



1 disruption of normal behaviors, and disturbances to habitat. The impacts on coast horned lizard  
2 from the project alternatives would be less than significant with mitigation because these  
3 aforementioned measures would replace lost habitat and reduce direct effects on the species,  
4 including habitat disturbance, by avoiding construction and maintenance activities in and adjacent  
5 to habitat to the extent possible; timing construction activities, conducting preconstruction surveys,  
6 and other protective measures to avoid and minimize the potential for injury and mortality; and by  
7 putting in place traffic control measures at DWR facilities during operations to minimize the  
8 potential for vehicle strikes.

### 9 **Mitigation Measure CMP: Compensatory Mitigation Plan**

10 DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to  
11 offset the loss of coast horned lizard habitat by creating and protecting grasslands on Bouldin  
12 Island (Appendix 3F, Section 3F.3.3.2) and through the protection of upland grasslands as part  
13 of California red-legged frog and California tiger salamander mitigation, which would involve  
14 purchasing conservation credits at a USFWS- and CDFW-approved conservation bank (Appendix  
15 3F, Section 3F.3.3.3 and Attachment 3F.1, Table 3F.1-3), which could contain suitable habitat for  
16 coast horned lizard. Though these mitigation areas would be specifically targeting suitable  
17 habitat for California red-legged frog and California tiger salamander, they would mostly likely  
18 occur within the range of coast horned lizard and could generally provide suitable upland  
19 habitat for the species.

### 20 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 21 **Resources from Maintenance Activities**

22 See description of Mitigation Measure BIO-2b under Impact BIO-2.

### 23 **Mitigation Measure BIO-22b: Avoid and Minimize Operational Traffic Impacts on Wildlife**

24 See description of Mitigation Measure BIO-22b under Impact BIO-22.

### 25 **Mitigation Measure BIO-26: Avoid and Minimize Impacts on Special-Status Reptiles**

#### 26 ***All Project Alternatives***

27 The following measures will be required to avoid and minimize impacts on special-status  
28 reptiles.

- 29 1. During project implementation and prior to project construction, DWR will direct a qualified  
30 biologist to conduct a habitat assessment in modeled habitat for coast horned lizard,  
31 Northern California legless lizard, California glossy snake, and San Joaquin coachwhip to  
32 confirm these areas contain suitable habitat for the species as defined in the species  
33 accounts in Appendix 13B.
- 34 2. Where suitable habitat exists, the qualified biologist will conduct a preconstruction survey  
35 for special-status reptiles immediately prior to the start of vegetation clearing or ground-  
36 disturbing activities. If there is a lapse in construction in a work area for 7 days or more,  
37 these surveys will be repeated before activities resume.
- 38 3. If special-status reptiles are found in work areas, the biologist will first attempt to allow  
39 these species to move out of harm's way on their own, but if conditions do not allow this,

- 1 individuals will be captured by the biologist and relocated to the nearest suitable habitat  
2 outside of the work area, as determined in consultation with CDFW.
- 3 4. Vehicles that are parked near suitable habitat for these species overnight or for more than 1  
4 hour during the day, shall be inspected to ensure no reptiles have taken refuge beneath the  
5 tires prior to moving the vehicles.
- 6 5. To the extent practicable, work in areas with suitable habitat should not be conducted  
7 during periods of cold and hot temperatures (below 67 degrees Fahrenheit [°F] and above  
8 100°F), because these species would generally be relatively inactive during these periods  
9 and could be taking cover in loose soil, in burrows or crevices, or under structures such as  
10 rocks or logs. This will reduce the likelihood of special-status reptiles being injured or killed  
11 by ground-disturbing activities.

## 12 ***Mitigation Impacts***

13 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
14 mitigation measure impacts. The analyses below consider the potential impacts associated with  
15 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
16 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
17 *Measures*.

### 18 *Compensatory Mitigation*

19 The creation and enhancement of wetlands and other waters, as well as habitat for special-status  
20 species on Bouldin Island and the I-5 ponds under the project's CMP, would affect modeled habitat  
21 for coast horned lizard (Appendix 13C) from vegetation removal and grading to create the  
22 appropriate topography and soil conditions to establish or restore habitats. The CMP could also  
23 impact modeled habitat for coast horned lizard through tidal wetland habitat restoration and  
24 channel margin enhancement because potential areas identified generally overlap with modeled  
25 habitat (Appendix 3F, Section 3F.4.3.4.2).

26 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
27 enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in the temporary  
28 disturbance of coast horned lizard habitat and the potential for injury or mortality of this species.  
29 Site-specific analyses are not provided because locations of potential non-bank sites are not  
30 currently known.

31 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
32 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
33 management of agricultural areas but may also include natural communities in the study area  
34 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
35 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
36 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
37 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could potentially contain grasslands  
38 suitable for coast horned lizard and management activities could affect this habitat and result in the  
39 disruption of normal behaviors, injury, and mortality. Site-specific analyses are not provided  
40 because locations of potential protection instruments are not currently known.

41 The CMP and site-specific permitting approvals would ensure that there is no significant loss in  
42 habitat or habitat value by adjusting the overall commitment (Appendix 3F, Section 3F.1, Section

1 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General Design Guidelines*) and, therefore, reduce  
2 any habitat losses associated with the CMP to a less-than-significant level. These activities would  
3 also have the potential for injury, mortality, and the disruption of normal behaviors of individuals.  
4 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-3: *Develop and*  
5 *Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best*  
6 *Management Practices for Biological Resources* (Appendix 3B); and Mitigation Measure BIO-26: *Avoid*  
7 *and Minimize Impacts on Special-Status Reptiles* would reduce these potential impacts by (1) training  
8 construction staff on protecting sensitive biological resources, reporting requirements, and the  
9 ramifications for not following these measures; (2) implementing spill prevention and containment  
10 plans that would avoid material spills that could affect the viability of nearby habitat; (3) having a  
11 biological monitor present to ensure that non-disturbance buffers and associated construction  
12 fencing are intact and all other protective measures are being implemented; and (4) avoiding  
13 construction activities in and adjacent to habitat to the extent possible, timing construction  
14 activities, conducting preconstruction surveys, and other protective measures to avoid and  
15 minimize the potential for injury and mortality, where applicable.

16 The impact on coast horned lizard from the project alternatives with the CMP would be less than  
17 significant with mitigation.

#### 18 Other Mitigation Measures

19 Some mitigation measures would involve ground disturbance and the use of heavy equipment that  
20 would have the potential to result in loss of modeled coast horned lizard habitat or result in injury,  
21 mortality, and disruption of feeding, breeding, and dispersal of coast horned lizard from ground  
22 disturbance or inadvertent discharge of construction-related fluids such as fuels, oils, and cement.  
23 Impacts on coast horned lizard resulting from implementation of mitigation measures would be  
24 similar to construction effects of the project alternatives in certain construction areas and would  
25 contribute to coast horned lizard impacts of the project alternatives.

26 However, the impacts of habitat loss, ground disturbance and exposure to hazardous materials on  
27 coast horned lizard would be reduced through the CMP; Environmental Commitments EC-1: *Conduct*  
28 *Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*;  
29 EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11:  
30 *Fugitive Dust Control*; EC-14: *Construction Best Management Practices for Biological Resources*; and  
31 Mitigation Measure BIO-26: *Avoid and Minimize Impacts on Special-Status Reptiles*. Therefore,  
32 impacts on coast horned lizard from implementation of other mitigation measures would be  
33 reduced to less than significant.

34 Overall, the impacts on coast horned lizard from construction of compensatory mitigation and  
35 implementation of other mitigation measures, combined with project alternatives, would not change  
36 the impact conclusion of less than significant with mitigation.

#### 37 **Impact BIO-27: Impacts of the Project on Northern California Legless Lizard**

38 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
39 information on the species life history and habitat suitability model for Northern California legless  
40 lizard are presented in the species account in Appendix 13B, Section 13B.52, *Northern California*  
41 *Legless Lizard*.

## 1 **All Project Alternatives**

### 2 Construction

3 The construction of all the project alternatives would result in the permanent and temporary loss of  
 4 Northern California legless lizard modeled habitat. The loss of habitat would primarily occur as a  
 5 result of the levee improvement work, new roads and road improvements, and the South Delta  
 6 Outlet and Control Structure (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) (Appendix 13C). The  
 7 central alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would result in greater impacts on  
 8 modeled habitat compared to the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and  
 9 the Bethany Reservoir alignment (Alternative 5) largely because of the levee improvements on  
 10 Bouldin Island and road improvements throughout the central alignment (Table 13-64).  
 11 Environmental Commitment EC-14: *Construction Best Management Practices for Biological Resources*  
 12 would ensure that temporarily disturbed areas are restored (Appendix 3B).

13 **Table 13-64. Impacts on Modeled Habitat for California Legless Lizard by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	236.80	41.91	278.71
2a	250.28	47.54	297.82
2b, 2c	230.84	47.54	278.38
3, 4b, 4c	29.09	8.76	37.85
4a	48.53	8.76	57.29
5	16.16	14.93	31.09

14 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 15 discussion in Section 13.3.1.2.  
 16

17 Construction activities for all project alternatives could result in the injury, mortality, and disruption  
 18 of feeding, breeding, and dispersal of Northern California legless lizard. These effects could result  
 19 from project grading, excavation, the use of construction-related vehicles, and exposure of Northern  
 20 California legless lizards to construction-related fluids, such as fuels, oils, and cement.  
 21 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
 22 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
 23 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
 24 *Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training  
 25 construction staff on protecting sensitive biological resources, reporting requirements, and the  
 26 ramifications for not following these measures; (2) implementing spill prevention and containment  
 27 plans that would avoid material spills that could affect the viability of nearby habitat; and (3) having  
 28 a biological monitor present to ensure that non-disturbance buffers and associated construction  
 29 fencing are intact and all other protective measures are being implemented, where applicable.

30 There are no CNDDDB occurrences of Northern California legless lizard in locations that would be  
 31 permanently or temporarily affected by project construction for any of the alternatives (California  
 32 Department of Fish and Wildlife 2020a). The nearest occurrence is approximately 5 miles northwest  
 33 of the Southern Forebay (California Department of Fish and Wildlife 2020a).

34 Field investigations for all project alternatives would be conducted prior to and during construction  
 35 to more specifically identify appropriate construction methods and design criteria addressed in the

1 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
2 and address the establishment of geological and groundwater monitoring programs (Delta  
3 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
4 variety of ground-disturbing activities that would vary in duration from several hours to  
5 approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
6 Construction Authority 2022a, 2022b) and could result in impacts on habitat and the potential for  
7 injury, mortality, and the disruption of normal behaviors of Northern California legless  
8 lizard. Geotechnical investigations that would occur in the West Tracy Fault Study area and over the  
9 tunnel alignment footprints, which include test trenches, CPTs, soil borings, and geophysical arrays,  
10 would result in temporary impacts on habitat (Appendix 13C). The Bethany Fault Study  
11 investigations would not affect modeled Northern California legless lizard habitat. The following  
12 field investigations would be conducted within proposed surface construction footprints of project  
13 facilities (including portions of tunnel alignments) and would temporarily affect habitat: test  
14 trenches, CPTs, soil borings, ERT, groundwater testing and monitoring, monument installation, pilot  
15 studies for settlement, agronomic testing, and utility potholing. These temporary impacts are not  
16 characterized as an additional loss of habitat because impacts for these locations have already been  
17 quantified within the construction footprints but could still result in the potential for injury,  
18 mortality, and the disruption of normal behaviors of Northern California legless lizard, as discussed  
19 above for conveyance facility construction. Environmental Commitments EC-1: *Conduct Worker*  
20 *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
21 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
22 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these  
23 potential impacts by (1) training construction staff on protecting sensitive biological resources,  
24 reporting requirements, and the ramifications for not following these measures; (2) implementing  
25 spill prevention and containment plans that would avoid material spills that could affect the viability  
26 of nearby habitat; and (3) having a biological monitor present to ensure that non-disturbance  
27 buffers and associated construction fencing are intact and all other protective measures are being  
28 implemented, where applicable

### 29 Operations

30 All project alternatives have the potential for impacts on Northern California legless lizard from  
31 vehicle traffic on access roads during operations at project facilities. California legless lizards could  
32 in particular be struck by vehicle traffic on access roads to the Southern Complex (Alternatives 1, 2a,  
33 2b, 2c, 3, 4a, 4b, and 4c) and the Bethany Complex (Alternative 5) because these areas are further  
34 inside the range of the species and closer to CNDDDB occurrences of the species to the northwest and  
35 southwest (California Department of Fish and Wildlife 2020a).

### 36 Maintenance

37 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
38 in impacts on Northern California legless lizard. Maintenance activities across all facilities that could  
39 affect coast horned lizard include repaving of access roads every 15 years, semiannual general and  
40 ground maintenance (e.g., mowing, vegetation trimming, herbicide application), and daily or weekly  
41 inspections by vehicle, and could result in the injury, mortality, and disruption of normal behaviors  
42 (i.e., foraging, breeding, and dispersal) of Northern California legless lizard. Maintenance at the  
43 Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) would include annual embankment

1 repair and quarterly animal burrow filling, which could also result in the injury, mortality, and  
2 disruption of normal behaviors if individuals are present in these areas.

### 3 **CEQA Conclusion—All Project Alternatives**

4 The construction, operation, and maintenance of all project alternatives would result in impacts on  
5 Northern California legless lizard through the permanent and temporary loss of modeled habitat,  
6 habitat fragmentation, and the potential for injury, mortality, and the disruption of normal  
7 behaviors.

8 The temporary loss of habitat and the potential impacts of injury, mortality, and the disruption of  
9 normal behaviors of Northern California legless lizard from project construction would be reduced  
10 by Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
11 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
12 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
13 *Biological Resources* (Appendix 3B). Even with these commitments, however, the permanent loss of  
14 habitat from the construction of the alternatives and the potential for injury, mortality, and  
15 disruption of normal behaviors from construction, operations, and maintenance would be  
16 significant. Implementation of the CMP would offset the loss of Northern California legless lizard  
17 habitat by creating and protecting grasslands on Bouldin Island (Appendix 3F, Section 3F.3.3.2) and  
18 through the protection of upland grasslands as part of California red-legged frog and California tiger  
19 salamander mitigation (Appendix 3B, Section 3F.3.3.3 and Attachment 3F.1, Table 3F.1-3), which  
20 could contain suitable habitat for Northern California legless lizard. Mitigation Measures BIO-2b:  
21 *Avoid and Minimize Impacts on Terrestrial Biological Resources from Maintenance Activities*, BIO-22b:  
22 *Avoid and Minimize Operational Traffic Impacts on Wildlife*, and BIO-26: *Avoid and Minimize Impacts*  
23 *on Special-Status Reptiles* would be required to avoid and minimize the potential for injury,  
24 mortality, disruption of normal behaviors, and disturbances to habitat. The impacts on Northern  
25 California legless lizard from the project alternatives would be less than significant with mitigation  
26 because these aforementioned measures would replace lost habitat and reduce direct effects on the  
27 species, including habitat disturbance, by avoiding construction and maintenance activities in and  
28 adjacent to habitat to the extent possible; timing construction activities, installing exclusion fencing,  
29 conducting preconstruction surveys, and other protective measures to avoid and minimize the  
30 potential for injury and mortality; and by putting in place traffic control measures at DWR facilities  
31 during operations to minimize the potential for vehicle strikes.

### 32 **Mitigation Measure CMP: Compensatory Mitigation Plan**

33 DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to  
34 offset the loss of Northern California legless lizard habitat by creating and protecting grasslands  
35 on Bouldin Island (Appendix 3F, Section 3F.3.3.2) and through the protection of upland  
36 grasslands as part of California red-legged frog and California tiger salamander mitigation,  
37 which would involve purchasing conservation credits at a USFWS- and CDFW-approved  
38 conservation bank (Appendix 3F, Section 3F.3.3.3 and Attachment 3F.1, Table 3F.1-3), which  
39 could contain suitable habitat for Northern California legless lizard. Though these mitigation  
40 areas would be specifically targeting suitable habitat for California red-legged frog and  
41 California tiger salamander, they would mostly likely occur within the range of Northern  
42 California legless lizard and could generally provide suitable upland habitat for the species.

1           **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
2           **Resources from Maintenance Activities**

3           See description of Mitigation Measure BIO-2b under Impact BIO-2.

4           **Mitigation Measure BIO-22b: Avoid and Minimize Operational Traffic Impacts on Wildlife**

5           See description of Mitigation Measure BIO-22b under Impact BIO-22.

6           **Mitigation Measure BIO-26: Avoid and Minimize Impacts on Special-Status Reptiles**

7           See description of Mitigation Measure BIO-26 under Impact BIO-26.

8           ***Mitigation Impacts***

9           As discussed in Chapter 4, Section 4.1.1.5 *Mitigation Approaches*, CEQA requires an evaluation of  
10          mitigation measure impacts. The analyses below consider the potential impacts associated with  
11          implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
12          Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
13          *Measures*.

14          *Compensatory Mitigation*

15          The creation and enhancement of wetlands and other waters as well as habitat for special-status  
16          species under the project's CMP on Bouldin Island would affect modeled habitat for Northern  
17          California legless lizard (Appendix 13C) from vegetation removal and grading to create the  
18          appropriate topography and soil conditions to establish or restore habitats.

19          The creation and enhancement of wetlands and other waters as well as habitat for special-status  
20          species at the I-5 ponds, and tidal wetland habitat restoration and channel margin enhancement  
21          locations (Appendix 3F, Section 3F.4.3.4.2) under the project's CMP would not affect modeled  
22          habitat for Northern California legless lizard because these activities are outside of the known range  
23          of the species.

24          In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
25          enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
26          vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located, which are  
27          not habitats for California legless lizard; therefore, there would not likely be any effects on this  
28          species. Site-specific analyses are not provided because locations of potential non-bank sites are not  
29          currently known.

30          Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
31          crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
32          management of agricultural areas but may also include natural communities in the study area  
33          (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
34          *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
35          CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
36          CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could potentially contain habitat for  
37          the species and management activities could affect this habitat and result in the disruption of  
38          normal behaviors, injury, and mortality. Site-specific analyses are not provided because locations of  
39          potential protection instruments are not currently known.

1 The CMP and site-specific permitting approvals would ensure that there is no significant loss in  
2 habitat or habitat value by adjusting the overall commitment (Appendix 3F, Section 3F.1, Section  
3 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General Design Guidelines*) and, therefore, reduce  
4 any habitat losses associated with the CMP to a less-than-significant level. These activities would  
5 also have the potential for injury, mortality, and the disruption of normal behaviors of individuals.  
6 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-3: *Develop and*  
7 *Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best*  
8 *Management Practices for Biological Resources* (Appendix 3B); and Mitigation Measure BIO-26: *Avoid*  
9 *and Minimize Impacts on Special-Status Reptiles* would reduce these potential impacts by (1) training  
10 construction staff on protecting sensitive biological resources, reporting requirements, and the  
11 ramifications for not following these measures; (2) implementing spill prevention and containment  
12 plans that would avoid material spills that could affect the viability of nearby habitat; and (3) having  
13 a biological monitor present to ensure that non-disturbance buffers and associated construction  
14 fencing are intact and all other protective measures are being implemented; and by avoiding  
15 construction activities in and adjacent to habitat to the extent possible, timing construction  
16 activities, conducting preconstruction surveys, and other protective measures to avoid and  
17 minimize the potential for injury and mortality, where applicable.

18 The impact on Northern California legless lizard from the project alternatives with the CMP would  
19 be less than significant with mitigation.

#### 20 Other Mitigation Measures

21 Some mitigation measures would involve ground disturbance and the use of heavy equipment that  
22 would have the potential to result in loss of modeled Northern California legless lizard habitat or  
23 result in injury, mortality, and disruption of feeding, breeding, and dispersal of Northern California  
24 legless lizard from ground disturbance, movement of construction vehicles, or inadvertent discharge  
25 of construction-related fluids such as fuels, oils, and cement. Impacts on Northern California legless  
26 lizard resulting from mitigation measures would be similar to construction effects of the project  
27 alternatives in certain construction areas and would contribute to Northern California legless lizard  
28 impacts of the project alternatives.

29 However, the impacts of habitat loss, ground disturbance, noise, vibration, and exposure to  
30 hazardous materials on Northern California legless lizard would be reduced through the CMP;  
31 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
32 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
33 *Containment, and Countermeasure Plans*; EC-14: *Construction Best Management Practices for*  
34 *Biological Resources*; and Mitigation Measure BIO-26: *Avoid and Minimize Impacts on Special-Status*  
35 *Reptiles*. Therefore, impacts on Northern California legless lizard from implementation of other  
36 mitigation measures would be reduced to less than significant.

37 Overall, the impacts on Northern California legless lizard from construction of compensatory  
38 mitigation and implementation of other mitigation measures, combined with project alternatives,  
39 would not change the impact conclusion of less than significant with mitigation.

#### 40 **Impact BIO-28: Impacts of the Project on California Glossy Snake**

41 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
42 information on the species life history and habitat suitability model for California glossy snake are  
43 presented in the species account in Appendix 13B, Section 13B.53, *California Glossy Snake*.



1 ***All Project Alternatives***

2 ***Construction***

3 Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c would not affect modeled habitat for California glossy  
4 snake. Alternative 5 would result in temporary impacts on modeled habitat from geotechnical  
5 investigations over the Bethany Reservoir Discharge Structure (Table 13-65). Environmental  
6 Commitment EC-14: *Construction Best Management Practices for Biological Resources* would ensure  
7 that temporarily disturbed areas are restored (Appendix 3B).

8 **Table 13-65. Impacts on Modeled Habitat for California Glossy Snake by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1, 2a, 2b, 2c, 3, 4a, 4b, 4c	0.00	0.00	0.00
5	0.00	0.05	0.05

9 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
10 discussion in Section 13.3.1.2.  
11

12 The construction of the SCADA line to the Banks Pumping Plant under Alternatives 1, 2a, 2b, 2c, 3,  
13 4a, 4b, and 4c is within 0.3 mile of modeled habitat, and although unlikely, it could possibly affect  
14 California glossy snake if individuals are in this area during construction. Alternative 5 could result  
15 in the potential injury, mortality, and disruption of normal behaviors of California glossy snakes if  
16 they are occupying modeled habitat adjacent to Bethany Reservoir Discharge Structure and the  
17 associated access road and power transmission line. These potential impacts would result from  
18 grading, excavation, the movement of construction vehicles in these areas, and accidental spills of  
19 construction-related fluids, such as fuels, oils, and cement. Environmental Commitments EC-1:  
20 *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management*  
21 *Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and  
22 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would  
23 reduce these potential impacts by (1) training construction staff on protecting sensitive biological  
24 resources, reporting requirements, and the ramifications for not following these measures; (2)  
25 implementing spill prevention and containment plans that would avoid material spills that could  
26 affect the viability of nearby habitat; and (3) having a biological monitor present to ensure that non-  
27 disturbance buffers and associated construction fencing are intact and all other protective measures  
28 are being implemented, where applicable.

29 There are no CNDDDB occurrences within the footprints of any of the alternatives. The nearest  
30 occurrence is more than 7 miles northwest of the nearest project infrastructure, which is the SCADA  
31 line near Brentwood (California Department of Fish and Wildlife 2020a).

32 Field investigations for Alternative 5 would be conducted prior to and during construction to more  
33 specifically identify appropriate construction methods and design criteria addressed in the final  
34 design documents, verify soil rehabilitation methods, confirm the locations of existing utilities, and  
35 address the establishment of geological and groundwater monitoring programs (Delta Conveyance  
36 Design and Construction Authority 2022a, 2022b). Field investigations would involve a variety of  
37 ground-disturbing activities that would vary in duration from several hours to approximately 6  
38 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and Construction Authority  
39 2022a, 2022b). and could result in impacts on habitat and the potential for injury, mortality, and the  
40 disruption of normal behaviors of California glossy snake. Geotechnical investigations associated

1 with the tunnel for the Bethany Reservoir Aqueduct (Alternative 5), which include CPTs and soil  
2 borings, would result in temporary impacts on modeled habitat (Appendix 13C). Utility potholing  
3 would also occur within the footprints for the Bethany Reservoir Aqueduct and the Bethany  
4 Reservoir Discharge Structure and would temporarily affect habitats. These temporary impacts are  
5 not characterized as an additional loss of habitat because impacts for these locations have already  
6 been quantified within the construction footprints, but could still result in the potential for injury,  
7 mortality, and the disruption of normal behaviors of California glossy snake, as discussed above for  
8 conveyance facility construction. All other geotechnical investigations, including the West Tracy  
9 Fault Study and the Bethany Fault Study investigations, would occur outside of the limits of modeled  
10 habitat for the species in the study area. Environmental Commitments EC-1: *Conduct Worker*  
11 *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
12 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
13 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these  
14 potential impacts by (1) training construction staff on protecting sensitive biological resources,  
15 reporting requirements, and the ramifications for not following these measures; (2) implementing  
16 spill prevention and containment plans that would avoid material spills that could affect the viability  
17 of nearby habitat; and (3) having a biological monitor present to ensure that non-disturbance  
18 buffers and associated construction fencing are intact and all other protective measures are being  
19 implemented, where applicable.

#### 20 Operations

21 Alternative 5 has the potential for impacts on California glossy snake during operations from vehicle  
22 traffic that occurs at night (the species is nocturnal) on the access road leading to the Bethany  
23 Reservoir Discharge Structure, which could result in the injury, mortality, and disruption of normal  
24 behaviors.

#### 25 Maintenance

26 The maintenance of the Bethany Reservoir Discharge Structure and associated access road, which  
27 would include repaving of access roads every 15 years, semiannual general and ground maintenance  
28 (e.g., mowing, vegetation trimming, herbicide application), and daily or weekly inspections by  
29 vehicle, could result in the injury, mortality, and disruption of normal behaviors of California glossy  
30 snake; however, the potential for this impact would be low because the species is nocturnal.

#### 31 **CEQA Conclusion—All Project Alternatives**

32 Construction of all project alternatives and the operations and maintenance under Alternative 5  
33 would result in impacts on California glossy snake through the temporary disturbance of modeled  
34 habitat and the potential for injury, mortality, and the disruption of normal behaviors.

35 The temporary disturbances to habitat, the potential impacts of injury, mortality, and the disruption  
36 of normal behaviors from project construction would be reduced by Environmental Commitments  
37 EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials*  
38 *Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure*  
39 *Plans*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B).  
40 Even with these commitments the potential for injury, mortality, and disruption of normal behaviors  
41 from construction of all alternatives and operations and maintenance under Alternative 5 would be  
42 significant. Mitigation Measures BIO-2b: *Avoid and Minimize Impacts on Terrestrial Biological*

1 *Resources from Maintenance Activities, BIO-22b: Avoid and Minimize Operational Traffic Impacts on*  
2 *Wildlife, and BIO-26: Avoid and Minimize Impacts on Special-Status Reptiles* would be required to  
3 avoid and minimize the potential for injury, mortality, disruption of normal behaviors, and  
4 disturbances to habitat. The impacts on California glossy snake from the project alternatives would  
5 be less than significant with mitigation because these aforementioned measures would reduce  
6 direct effects on the species, including habitat disturbance, by avoiding construction and  
7 maintenance activities in and adjacent to habitat to the extent possible; timing construction  
8 activities, conducting preconstruction surveys, and other protective measures to avoid and  
9 minimize the potential for injury and mortality; and by putting in place traffic control measures at  
10 DWR facilities during operations to minimize the potential for vehicle strikes.

### 11 **Mitigation Measure CMP: Compensatory Mitigation Plan**

12 The CMP that DWR would implement (see Impact BIO-1 for a summary discussion of the CMP)  
13 would not specifically mitigate for California glossy snake habitat; however, DWR's protection of  
14 upland habitat associated with California red-legged frog and California tiger salamander  
15 mitigation (Appendix 3F, Section 3F.3.3.3 and Attachment 3F.1, Table 3F.1-3), could contain  
16 suitable habitat for California glossy snake. Though these mitigation areas would be specifically  
17 targeting suitable habitat for California red-legged frog and California tiger salamander, they  
18 would mostly likely occur within the range of California glossy snake and could generally  
19 provide suitable upland habitat for the species.

### 20 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 21 **Resources from Maintenance Activities**

22 See description of Mitigation Measure BIO-2b under Impact BIO-2.

### 23 **Mitigation Measure BIO-22b: Avoid and Minimize Operational Traffic Impacts on Wildlife**

24 See description of Mitigation Measure BIO-22b under Impact BIO-22.

### 25 **Mitigation Measure BIO-26: Avoid and Minimize Impacts on Special-Status Reptiles**

26 See description of Mitigation Measure BIO-26 under Impact BIO-26.

### 27 ***Mitigation Impacts***

28 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
29 mitigation measure impacts. The analyses below consider the potential impacts associated with  
30 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
31 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
32 *Measures*.

### 33 **Compensatory Mitigation**

34 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
35 species under the project's CMP would not affect modeled habitat for California glossy snake  
36 because the restoration activities at the I-5 ponds and on Bouldin Island, as well as the potential  
37 locations of tidal restoration and channel margin enhancement, are outside of the known range of  
38 the species.

1 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
2 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
3 vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located, which are  
4 not habitats for California glossy snake; therefore, there would not likely be any effects on this  
5 species. Site-specific analyses are not provided because locations of potential non-bank sites are not  
6 currently known.

7 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
8 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
9 management of agricultural areas but may also include natural communities in the study area  
10 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
11 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
12 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
13 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas would not likely be within the range  
14 of the species and therefore no effects are anticipated. Site-specific analyses are not provided  
15 because locations of potential protection instruments are not currently known. The impact on  
16 California glossy snake from the project alternatives with the CMP would be less than significant  
17 with mitigation.

#### 18 Other Mitigation Measures

19 Some mitigation measures would involve ground disturbance and the use of heavy equipment that  
20 would have the potential to result in loss of modeled California glossy snake habitat or result in  
21 injury, mortality, and disruption of normal behaviors of California glossy snake from ground  
22 disturbance, movement of construction vehicles, or inadvertent discharge of construction-related  
23 fluids such as fuels, oils, and cement. Impacts on California glossy snake resulting from  
24 implementation of mitigation measures would be similar to construction effects of the project  
25 alternatives in certain construction areas and would contribute to California glossy snake impacts of  
26 the project alternatives.

27 However, the impacts of habitat loss, ground disturbance, and exposure to hazardous materials on  
28 California glossy snake would be reduced through the CMP; Environmental Commitments EC-1:  
29 *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management*  
30 *Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-14:  
31 *Construction Best Management Practices for Biological Resources*; and Mitigation Measure BIO-26:  
32 *Avoid and Minimize Impacts on Special-Status Reptiles*. Therefore, impacts on California glossy snake  
33 from implementation of other mitigation measures would be reduced to less than significant.

34 Overall, the impacts on California glossy snake from construction of compensatory mitigation and  
35 implementation of other mitigation measures, combined with project alternatives, would not change  
36 the impact conclusion of less than significant with mitigation.

#### 37 **Impact BIO-29: Impacts of the Project on San Joaquin Coachwhip**

38 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1, and  
39 information on the species life history and habitat suitability model for San Joaquin coachwhip are  
40 presented in the species account in Appendix 13B, Section 13B.54, *San Joaquin Coachwhip*.

1 ***All Project Alternatives***

2 ***Construction***

3 The construction of the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and the  
 4 Bethany Complex (Alternative 5) would result in the permanent and temporary loss of San Joaquin  
 5 coachwhip modeled habitat. Construction-related grading and excavation would result in the  
 6 permanent and temporary loss of San Joaquin coachwhip habitat (Table 13-66). Environmental  
 7 Commitment EC-14: *Construction Best Management Practices for Biological Resources* would ensure  
 8 that temporarily disturbed areas are restored (Appendix 3B).

9 **Table 13-66. Impacts on Modeled Habitat for San Joaquin Coachwhip by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1, 2b, 2c, 3, 4b, 4c	87.27	15.12	102.39
2a, 4a	164.59	16.63	181.22
5	50.12	20.71	70.83

10 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 11 discussion in Section 13.3.1.2.  
 12

13 Construction activities associated with the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b,  
 14 and 4c) and Bethany Complex (Alternatives 5) could result in the injury, mortality, and disruption of  
 15 normal behaviors of San Joaquin coachwhip if individuals are moving on the surface or occupying  
 16 mammal burrows during activities such as grading, excavation, soil compaction, and the use of  
 17 construction-related vehicles. San Joaquin coachwhip could also be trapped in open trenches or  
 18 other excavations and become vulnerable to predation. Construction activities could also result in  
 19 the exposure of San Joaquin coachwhip to construction-related fluids, such as fuels, oils, and cement,  
 20 which could result in injury or mortality. Construction noise and vibration could also disrupt normal  
 21 behaviors and result in increased energy expenditures, predation risk, and potential for injury or  
 22 mortality from nearby construction if these activities result in individuals leaving cover.  
 23 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
 24 *Implement Hazardous Materials Management Plans*, EC-3: *Develop and Implement Spill Prevention,*  
 25 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
 26 *Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training  
 27 construction staff on protecting sensitive biological resources, reporting requirements, and the  
 28 ramifications for not following these measures; by (2) implementing spill prevention and  
 29 containment plans that would avoid material spills that could affect the viability of nearby habitat;  
 30 and (3) having a biological monitor present to ensure that non-disturbance buffers and associated  
 31 construction fencing are intact and all other protective measures are being implemented, where  
 32 applicable.

33 There are no occurrences for San Joaquin coachwhip in the study area and the nearest occurrence is  
 34 approximately 5 miles west of Bethany Reservoir (California Department of Fish and Wildlife  
 35 2020a).

36 Field investigations for all project alternatives would be conducted prior to and during construction  
 37 to more specifically identify appropriate construction methods and design criteria addressed in the  
 38 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
 39 and address the establishment of geological and groundwater monitoring programs (Delta

1 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
2 variety of ground-disturbing activities that would vary in duration from several hours to  
3 approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
4 Construction Authority 2022a, 2022b) and could result in impacts on habitat and the potential for  
5 injury, mortality, and the disruption of normal behaviors of San Joaquin coachwhip. Geotechnical  
6 investigations that would occur in the West Tracy Fault Study area, the tunnels linking the Southern  
7 Forebay to the South Delta Outlet and Control Structure (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c),  
8 the tunnel from the intakes to the Bethany Complex, and the tunnel for the Bethany Reservoir  
9 Aqueduct (Alternative 5), which include test trenches, CPTs, and soil borings, would result in  
10 temporary impacts on habitat (Appendix 13C). The Bethany Fault Study geotechnical investigations  
11 (Alternative 5) would be completed in a single day and would involve placing approximately 20 ERT  
12 probes 0.5 inch in diameter. The study would be conducted entirely on foot, perpendicular to the  
13 tunneled portion of the Bethany Reservoir Aqueduct (Delta Conveyance Design and Construction  
14 Authority 2022a, 2022b). The Bethany Fault Study could result in minor disruption of normal  
15 behaviors, but because of its small footprint and the short (1 day) duration of the disturbance,  
16 impacts on modeled habitat are not quantified and are considered negligible. The following field  
17 investigations would be conducted within proposed surface construction footprints of project  
18 facilities (including portions of tunnel alignments) and would temporarily affect habitat: test  
19 trenches, CPTs, soil borings, ERT, groundwater testing and monitoring, monument installation, pilot  
20 studies for settlement, agronomic testing, and utility potholing. These temporary impacts are not  
21 characterized as an additional loss of habitat because impacts for these locations have already been  
22 quantified within the construction footprints but could still result in the potential for injury,  
23 mortality, and the disruption of normal behaviors of San Joaquin coachwhip, as discussed above for  
24 conveyance facility construction. Environmental Commitments EC-1: *Conduct Worker Awareness*  
25 *Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and*  
26 *Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best*  
27 *Management Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts  
28 by (1) training construction staff on protecting sensitive biological resources, reporting  
29 requirements, and the ramifications for not following these measures; (2) implementing spill  
30 prevention and containment plans that would avoid material spills that could affect the viability of  
31 nearby habitat; and (3) having a biological monitor present to ensure that non-disturbance buffers  
32 and associated construction fencing are intact and all other protective measures are being  
33 implemented, where applicable.

#### 34 Operations

35 All project alternatives have the potential for impacts on San Joaquin coachwhip from vehicle traffic  
36 on access roads during operations at project facilities. San Joaquin coachwhip could in particular be  
37 struck by vehicle traffic on access roads to the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b,  
38 and 4c) and the Bethany Complex (Alternative 5)

#### 39 Maintenance

40 The maintenance of the Southern Complex on Byron Tract and west of Byron Highway (Alternatives  
41 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and the Bethany Complex (Alternative 5) could result in impacts on  
42 San Joaquin coachwhip.

43 Maintenance at the Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) would include  
44 annual embankment repair, repaving of access roads every 15 years, quarterly animal burrow

1 filling, quarterly weed management (e.g., mechanical removal and herbicide application), and  
2 semiannual general and ground maintenance (e.g., mowing, vegetation trimming), and daily or  
3 weekly inspections by vehicle, and could result in the injury and mortality of San Joaquin coachwhip  
4 occupying burrows or moving through these areas during these activities.

5 Maintenance activities at the South Delta Outlet and Control Structure (Alternatives 1, 2a, 2b, 2c, 3,  
6 4a, 4b, and 4c), which would include semiannual general and ground maintenance (e.g., mowing,  
7 vegetation trimming, herbicide application) and daily or weekly inspections by vehicle, could result  
8 in the injury and mortality of San Joaquin coachwhip. These impacts would occur if San Joaquin  
9 coachwhip is occupying burrows in areas where vegetation management takes place or if they are  
10 moving through these areas.

11 Maintenance activities at the Bethany Complex (Alternative 5), which would include repaving of  
12 access roads every 15 years, semiannual general and ground maintenance (e.g., mowing, vegetation  
13 trimming, herbicide application), and daily or weekly inspections by vehicle, could result in the  
14 injury, mortality, and disruption of normal behaviors of San Joaquin coachwhip if they are occupying  
15 burrows in areas where vegetation management takes place or if they are moving through these  
16 areas.

#### 17 ***CEQA Conclusion—All Project Alternatives***

18 Construction, operations, and maintenance of all project alternatives would result in impacts on San  
19 Joaquin coachwhip through the permanent and temporary loss of modeled habitat and the potential  
20 for injury, mortality, and the disruption of normal behaviors.

21 The temporary loss of habitat and the potential impacts of injury, mortality, and the disruption of  
22 normal behaviors of San Joaquin coachwhip from project construction would be reduced by  
23 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
24 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
25 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
26 *Biological Resources* (Appendix 3B). Even with these commitments, however, the permanent loss of  
27 habitat from construction of the project alternatives and the potential for injury, mortality, and  
28 disruption of normal behaviors from construction, operations, and maintenance on San Joaquin  
29 coachwhip would be significant. Implementation of the CMP would offset the loss of San Joaquin  
30 coachwhip habitat through the protection of upland grasslands as part of California red-legged frog  
31 and California tiger salamander mitigation (Appendix 3F, Section 3F.3.3.3 and Attachment 3F.1,  
32 Table 3F.1-3), which would overlap with the range of the species and could contain suitable habitat  
33 for San Joaquin coachwhip. Mitigation Measures BIO-2b: *Avoid and Minimize Impacts on Terrestrial*  
34 *Biological Resources from Maintenance Activities*, BIO-22b: *Avoid and Minimize Operational Traffic*  
35 *Impacts on Wildlife*, and BIO-26: *Avoid and Minimize Impacts on Special-Status Reptiles* would be  
36 required to avoid and minimize the potential for injury, mortality, disruption of normal behaviors,  
37 and disturbances to habitat. The impacts on San Joaquin coachwhip from the project alternatives  
38 would be less than significant with mitigation because these aforementioned measures would  
39 replace lost habitat with habitat potentially suitable and reduce direct effects on the species,  
40 including habitat disturbance, by avoiding construction and maintenance activities in and adjacent  
41 to habitat to the extent possible; timing construction activities, installing exclusion fencing,  
42 conducting preconstruction surveys, and other protective measures to avoid and minimize the  
43 potential for injury and mortality; and by putting in place traffic control measures at DWR facilities  
44 during operations to minimize the potential for vehicle strikes.

### 1 **Mitigation Measure CMP: Compensatory Mitigation Plan**

2 The CMP that DWR would implement (see Impact BIO-1 for a summary discussion of the CMP)  
3 would not specifically mitigate for San Joaquin coachwhip habitat; however, DWR's protection of  
4 upland habitat associated with California red-legged frog and California tiger salamander  
5 mitigation (Appendix 3F, Section 3F.3.3.3 and Attachment 3F.1, Table 3F.1-3), would overlap  
6 with the range of the species and could contain suitable habitat for San Joaquin coachwhip.

### 7 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 8 **Resources from Maintenance Activities**

9 See description of Mitigation Measure BIO-2b under Impact BIO-2.

### 10 **Mitigation Measure BIO-22b: Avoid and Minimize Operational Traffic Impacts on Wildlife**

11 See description of Mitigation Measure BIO-22b under Impact BIO-22.

### 12 **Mitigation Measure BIO-26: Avoid and Minimize Impacts on Special-Status Reptiles**

13 See description of Mitigation Measure BIO-26 under Impact BIO-26.

### 14 ***Mitigation Impacts***

15 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
16 mitigation measure impacts. The analyses below consider the potential impacts associated with  
17 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
18 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
19 *Measures*.

### 20 *Compensatory Mitigation*

21 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
22 species under the project's CMP would not affect modeled habitat for San Joaquin coachwhip  
23 because the restoration activities at the I-5 ponds and on Bouldin Island, as well as the potential  
24 locations of tidal restoration and channel margin enhancement, are outside of the known range of  
25 the species.

26 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
27 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
28 vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located, which are  
29 not habitats for San Joaquin coachwhip; therefore, there would not likely be any effects on this  
30 species. Site-specific analyses are not provided because locations of potential non-bank sites are not  
31 currently known.

32 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
33 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
34 management of agricultural areas but may also include natural communities in the study area  
35 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
36 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
37 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
38 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas would not likely include habitat for



1 San Joaquin coachwhip and therefore would not likely be affected. Site-specific analyses are not  
2 provided because locations of potential site protection instruments are not currently known.

3 The impact on San Joaquin coachwhip from the project alternatives with the CMP would be less than  
4 significant with mitigation.

#### 5 Other Mitigation Measures

6 Some mitigation measures would involve ground disturbance and the use of heavy equipment that  
7 would have the potential to result in loss of modeled San Joaquin coachwhip habitat or result in  
8 injury, mortality, and disruption of normal behaviors of San Joaquin coachwhip from ground  
9 disturbance, movement of construction vehicles, noise, vibration, or inadvertent discharge of  
10 construction-related fluids such as fuels, oils, and cement. Impacts on San Joaquin coachwhip  
11 resulting from mitigation measures would be similar to construction effects of the project  
12 alternatives in certain construction areas and would contribute to San Joaquin coachwhip impacts of  
13 the project alternatives.

14 However, the impacts of habitat loss, ground disturbance, noise, vibration, and exposure to  
15 hazardous materials on San Joaquin coachwhip would be reduced through the CMP; Environmental  
16 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
17 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
18 *Countermeasure Plans*; EC-14: *Construction Best Management Practices for Biological Resources*; and  
19 Mitigation Measure BIO-26: *Avoid and Minimize Impacts on Special-Status Reptiles*. Therefore,  
20 impacts on San Joaquin coachwhip from implementation of other mitigation measures would be  
21 reduced to less than significant.

22 Overall, the impacts on San Joaquin coachwhip from construction of compensatory mitigation and  
23 implementation of other mitigation measures, combined with project alternatives, would not change  
24 the impact conclusion of less than significant with mitigation.

#### 25 **Impact BIO-30: Impacts of the Project on Giant Garter Snake**

26 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
27 information on the species life history and habitat suitability model for giant garter snake are  
28 presented in the species account in Appendix 13B, Section 13B.55, *Giant Garter Snake*.

#### 29 ***All Project Alternatives***

##### 30 Construction

31 The construction of all the project alternatives would result in the permanent and temporary loss of  
32 giant garter snake modeled habitat as a result of construction-related grading, excavation, and filling  
33 of aquatic habitat (Table 13-67). The loss of habitat would primarily occur as a result of the levee  
34 improvement work under all alternatives (permanent aquatic and upland), the Southern Forebay  
35 (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c, permanent aquatic), new roads and road improvements  
36 (all alternatives, permanent and temporary aquatic and upland), and the intake construction (all  
37 alternatives, permanent aquatic and upland) (Appendix 13C). The central alignment alternatives  
38 (Alternatives 1, 2a, 2b, and 2c) would result in greater impacts on modeled habitat compared to the  
39 eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and the Bethany alternative  
40 (Alternative 5) largely because of the levee improvements on Bouldin Island and road

1 improvements throughout the central alignment. Environmental Commitment EC-14: *Construction*  
 2 *Best Management Practices for Biological Resources* would ensure that temporarily disturbed areas  
 3 are restored (Appendix 3B).

4 **Table 13-67. Impacts on Modeled Habitat for Giant Garter Snake by Alternative**

Alternative	Permanent Impacts—Aquatic (acres) <sup>a</sup>	Permanent Impacts—Upland (acres) <sup>a</sup>	Temporary Impacts—Aquatic (acres)	Temporary Impacts—Upland (acres)	Total (acres)
1	27.94	316.62	16.65	92.75	453.96
2a	26.29	322.67	19.85	103.85	472.66
2b	22.06	290.17	18.93	101.42	432.58
2c	24.07	304.86	19.66	103.11	451.70
3	16.86	80.84	15.92	57.63	171.25
4a	18.59	98.00	16.12	58.52	191.23
4b	14.60	65.51	15.19	56.08	151.38
4c	16.40	80.19	15.92	57.77	170.28
5	9.37	65.27	12.02	33.84	120.50

5 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 6 discussion in Section 13.3.1.2.  
 7

8 Construction activities associated with all project alternatives could result in the injury, mortality,  
 9 and disruption of normal behaviors of giant garter snake if they are moving on the surface or  
 10 occupying mammal burrows or other subsurface refugia during activities such as grading,  
 11 excavation, and soil compaction, in particular if conducted during the species inactive season  
 12 (generally October 1 to April 15). Construction vehicle traffic during the active season (generally  
 13 April 16 to September 31) could also result in similar impacts. Giant garter snake could also be  
 14 trapped in open trenches or other excavations and become vulnerable to predation. Construction  
 15 activities could also result in the exposure of giant garter snake to construction-related fluids, such  
 16 as fuels, oils, and cement, which could result in injury and mortality. Construction noise and  
 17 vibration could also disrupt normal behaviors and result in increased energy expenditures. The use  
 18 of tunnel boring machines during construction would potentially cause groundborne vibration in  
 19 the immediate vicinity of tunnel construction areas. However, because of the depth at which the  
 20 tunnel would be constructed, and because the deep soil cover over the tunnel would effectively  
 21 dampen and absorb propagated energy from the tunnel crown and the tunnel floor, no significant  
 22 noise and vibration effects from the operation of the tunnel boring machine on giant garter snake  
 23 are anticipated (Chapter 24, Section 24.4.3.2, *Impacts of the Project Alternatives Related to Noise and*  
 24 *Vibration*). Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop*  
 25 *and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
 26 *Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
 27 *Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1)  
 28 training construction staff on protecting sensitive biological resources, reporting requirements, and  
 29 the ramifications for not following these measures; (2) implementing spill prevention and  
 30 containment plans that would avoid material spills that could affect the viability of nearby aquatic  
 31 and upland habitat; and (3) having a biological monitor present to ensure that non-disturbance  
 32 buffers and associated construction fencing are intact and all other protective measures are being  
 33 implemented, where applicable.

1 The project alternatives together overlap with three CNDDDB occurrences. All alternatives have an  
2 overhead transmission line that would be installed on existing poles along Franklin Road that  
3 overlap with an occurrence (#52) from 1976 (California Department of Fish and Wildlife 2020a).  
4 Work related to the installation of this new line would be done from the existing right-of-way and  
5 would not disturb any habitat. All of the project alternatives have infrastructure that overlaps with  
6 an occurrence (#49) north and south of SR 12 just west of I-5 that spans a period from 1974 to 2010  
7 (California Department of Fish and Wildlife 2020a). All of the project alternatives have a SCADA line  
8 that would be placed within the SR 12 right-of-way in this area where there is no habitat and  
9 Alternatives 1, 2a, 2b, and 2c would include road widening on SR 12 and an underground power line  
10 that would affect modeled habitat for the species in this area. Alternatives 3, 4a, 4b, 4c, and 5 have  
11 an overhead SCADA line that would be installed on existing poles along Fyffe Avenue west of  
12 Stockton that overlaps with an occurrence (#351) from 1880. All work would be done from the  
13 existing right-of-way and there is no modeled habitat in this area.

14 Field investigations for all project alternatives would be conducted prior to and during construction  
15 to more specifically identify appropriate construction methods and design criteria addressed in the  
16 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
17 and address the establishment of geological and groundwater monitoring programs (Delta  
18 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
19 variety of ground-disturbing activities that would vary in duration from several hours to  
20 approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
21 Construction Authority 2022a, 2022b) and could result in impacts on habitat and the potential for  
22 injury, mortality, and the disruption of normal behaviors of giant garter snake. Geotechnical  
23 investigations that would occur in the West Tracy Fault Study area and over the tunnel alignment  
24 footprints, which include test trenches, CPTs, soil borings, and geophysical arrays, would result in  
25 temporary impacts on modeled habitat (Appendix 13C). The Bethany Fault Study investigations  
26 would not affect modeled giant garter snake habitat. The following field investigations would occur  
27 within proposed surface construction footprints of project facilities (including portions of tunnel  
28 alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT,  
29 groundwater testing and monitoring, monument installation, pilot studies for settlement, agronomic  
30 testing, and utility potholing. These temporary impacts are not characterized as an additional loss of  
31 habitat because impacts for these locations have already been quantified within the construction  
32 footprints but could still result in the potential for injury, mortality, and the disruption of normal  
33 behaviors of giant garter snake, as discussed above for conveyance facility construction.  
34 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
35 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
36 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
37 *Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training  
38 construction staff on protecting sensitive biological resources, reporting requirements, and the  
39 ramifications for not following these measures; (2) implementing spill prevention and containment  
40 plans that would avoid material spills that could affect the viability of nearby aquatic and upland  
41 habitat; (3) by having a biological monitor present to ensure that non-disturbance buffers and  
42 associated construction fencing are intact and all other protective measures are being implemented,  
43 where applicable; and (4) limiting construction vehicle traffic to a maximum speed limit of 15 miles  
44 per hour on unpaved, non-public construction access roads.

## 1        Operations

2        All project alternatives have the potential for operational impacts on giant garter snake from vehicle  
3        strikes and from changes to water quality.

4        Giant garter snakes moving across access roads could be struck by vehicles, resulting in injury or  
5        mortality. Trips on any given access roads to DWR facilities would be relatively infrequent but do  
6        pose a risk to the species where aquatic habitat occurs nearby, generally within 200 feet.

7        Changes in water operations under all project alternatives have the potential to exacerbate  
8        bioaccumulation of methylmercury in giant garter snakes. Although the magnitude of  
9        methylmercury bioaccumulation differs among species and foodwebs, largemouth bass was used as  
10       a surrogate species for analysis of impacts from changes in operations of the water conveyance  
11       facilities because they are good indicators of mercury contamination in aquatic foodwebs  
12       throughout the Delta (Wood et al. 2010: 67) and would reflect changes in methylmercury  
13       bioavailability due to the project (Appendix 9H, *Mercury*). The modeled effects of mercury  
14       concentrations from changes in water operations on largemouth bass did not differ substantially  
15       from existing conditions; therefore, these results also indicate giant garter snake methylmercury  
16       exposure would not measurably increase as a result of project operations.

17       Microcystin toxins originate in aquatic systems and can be transported through foodwebs through  
18       consumption (Moy et al. 2016:A) and can affect giant garter snake if they forage in aquatic habitats  
19       with conditions that promote CHABs. Operation of all project alternatives is not expected to  
20       substantially change the five factors that could create conditions more conducive to CHAB formation  
21       (i.e., temperature, residence time, nutrients, water velocities and associated turbulence and mixing,  
22       and water clarity and associated irradiance) relative to existing conditions within the Delta (Chapter  
23       9, *Water Quality*). The water quality modeling results show a potential for increased residence time  
24       in some locations and months within the central Delta, namely Discovery Bay where there are  
25       already very long residence times, which could contribute to increased *Microcystis* bloom size in  
26       some years at these locations if the remaining four environmental factors are also at levels  
27       conducive to forming CHABs. Nevertheless, based on known *Microcystis* dynamics in the Delta, a  
28       small increase of residence time at Discovery Bay would not cause *Microcystis* blooms to  
29       substantially increase in size or last substantially longer, relative to existing conditions. Because the  
30       project alternatives, through their effects on the five factors potentially associated with CHABs in the  
31       Delta, are not expected to cause Delta CHABs to be substantially larger in size, and because bloom  
32       size does not necessarily dictate toxin concentration in the water, the project alternatives are not  
33       expected to substantially increase microcystin or any other cyanotoxins in the Delta that could cause  
34       a substantial adverse impact on giant garter snake, relative to existing conditions.

35       Current use and legacy pesticides have the potential to bioaccumulate in the food items of giant  
36       garter snake. Operation of all project alternatives and potential runoff from project facilities would  
37       not result in substantial increases in pesticide concentrations in Delta waters or in Delta outflows,  
38       and would not result in land-use changes that would increase use of pesticides in habitats used by  
39       giant garter snakes, relative to existing conditions. Therefore, the project alternatives would not  
40       substantially reduce prey populations or increase pesticide exposure to giant garter snake.

41       Changes in water operations under all project alternatives have the potential to exacerbate  
42       bioaccumulation of selenium in giant garter snake. Modeled selenium concentrations in largemouth  
43       bass tissue, used as a surrogate, were below the level of concern and did not differ substantially  
44       from existing conditions under all alternatives (Appendix 9J), which suggests that selenium

1 exposure to giant garter snake would also not change. Therefore, the project alternatives are not  
2 anticipated to substantially increase the risk of selenium contamination in giant garter snake.

### 3 Maintenance

4 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
5 in impacts on giant garter snake. Maintenance at the Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3,  
6 4a, 4b, and 4c) would annual embankment repair, quarterly animal burrow filling, and quarterly  
7 weed management (e.g., mechanical removal and herbicide application) that could affect giant  
8 garter snake. Maintenance activities across all facilities that could affect giant garter snake include  
9 repaving of access roads every 15 years, semiannual general and ground maintenance (e.g., mowing,  
10 vegetation trimming, herbicide application), and daily or weekly inspections by vehicle. These  
11 maintenance activities and could result in the injury, mortality, and disruption of normal behaviors  
12 of giant garter snake if these activities occur adjacent to aquatic or upland habitat.

### 13 **CEQA Conclusion—All Project Alternatives**

14 The construction, operation, and maintenance of all project alternatives would result in impacts on  
15 giant garter snake through the permanent and temporary loss of modeled habitat and the potential  
16 for injury, mortality, and the disruption of normal behaviors.

17 For all project alternatives, changes in water operations would not be expected to result in a  
18 measurable increase in mercury or selenium bioavailability or pesticide or microcystin exposure to  
19 giant garter snake.

20 The temporary loss of habitat and the potential impacts of injury, mortality, and the disruption of  
21 normal behaviors of giant garter snake from project construction activities would be reduced by  
22 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
23 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
24 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
25 *Biological Resources* (Appendix 3B). Even with these commitments, however, the permanent loss of  
26 habitat from the construction of the project alternatives and the potential for injury, mortality, and  
27 disruption of normal behaviors from construction, operations, and maintenance would be  
28 significant. Implementation of the CMP would create and protect giant garter snake aquatic and  
29 upland habitat (Appendix 3F, Section 3F.4.1.4.3 and Attachment 3F.1, Table 3F.1-3, CMP-15: *Giant*  
30 *Garter Snake Habitat*), which would reduce the habitat loss impact to less than significant. Mitigation  
31 Measures, BIO-2b: *Avoid and Minimize Impacts on Terrestrial Biological Resources from Maintenance*  
32 *Activities*, BIO-22b: *Avoid and Minimize Operational Traffic Impacts on Wildlife*, and BIO-30: *Avoid*  
33 *and Minimize Impacts on Giant Garter Snake* would be required to avoid and minimize the potential  
34 for injury, mortality, disruption of normal behaviors, and disturbances to habitat. The impacts on  
35 giant garter snake from the project alternatives would be less than significant with mitigation  
36 because these aforementioned measures would replace lost habitat and reduce direct effects on the  
37 species, including habitat disturbance, by avoiding construction and maintenance activities in and  
38 adjacent to habitat to the extent possible; timing construction activities, installing exclusion fencing,  
39 conducting preconstruction surveys, and other protective measures to avoid and minimize the  
40 potential for injury and mortality; and by putting in place traffic control measures at DWR facilities  
41 during operations to minimize the potential for vehicle strikes.

1           **Mitigation Measure CMP: Compensatory Mitigation Plan**

2           DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to  
3           offset the loss of giant garter snake habitat by creating and protecting giant garter snake aquatic  
4           and upland habitat (Appendix 3F, Section 3F.4.1.4.3 and Attachment 3F.1, Table 3F.1-3, CMP-15:  
5           *Giant Garter Snake Habitat*). The CMP would ensure that wetland habitat is designed specifically  
6           for giant garter snake needs, including aquatic habitat with appropriate ponding and emergent  
7           vegetation, and suitable upland habitat. Future channel margin enhancement and tidal wetland  
8           habitat (Appendix 3F, Section 3F.4.3) would also provide potential habitat for giant garter snake.

9           **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
10          **Resources from Maintenance Activities**

11          See description of Mitigation Measure BIO-2b under Impact BIO-2.

12          **Mitigation Measure BIO-22b: Avoid and Minimize Operational Traffic Impacts on Wildlife**

13          See description of Mitigation Measure BIO-22b under Impact BIO-22.

14          **Mitigation Measure BIO-30: Avoid and Minimize Impacts on Giant Garter Snake**

15          ***All Project Alternatives***

16          The following measures for giant garter snake will only be required for construction and  
17          restoration activities occurring within suitable habitat as identified from the habitat modeling  
18          and by additional assessments conducted during the planning for work in a given area.

19          During project implementation and prior to project construction, DWR, in agreement with  
20          CDFW and USFWS, will perform the following measures.

- 21          1. When each site is available for surveys, a USFWS- and CDFW-approved biologist, will then  
22             delineate giant garter snake habitat at each project site, based on an agreed upon definition  
23             of suitable habitat, including both aquatic and upland habitat.
- 24          2. Once habitat has been delineated, the biologist may use giant garter snake surveys  
25             performed using a method approved by USFWS to determine presence of the species on the  
26             project site to enable further determination of compensatory mitigation requirements.
- 27          3. For sites where such surveys are performed, the surveys will conform to established  
28             protocols for giant garter snake surveys and all occurrence data gathered will be reported to  
29             the CNDDDB and USFWS to add to the understanding of populations and occurrences for the  
30             species in the Delta.
- 31          4. To the greatest extent possible, identified and delineated habitat will be completely avoided.

32          If the construction or restoration activity does not fully avoid effects on suitable habitat, the  
33          following measures will be implemented.

- 34          5. Initiate construction and clear suitable habitat in the summer months, between May 1 and  
35             October 1, and avoid giant garter snake habitat during periods of brumation (between  
36             October 1 and May 1). Suitability of aquatic and upland habitat characteristics will be  
37             determined by the biologist consistent with the description of suitable habitat defined in

- 1 Appendix 13B, Section 13B.55. Once a construction site has been cleared and exclusionary  
2 fencing is in place, work within the cleared area can occur between October 1 and May 1.
- 3 6. To the extent practicable, conduct all activities within paved roads, farm roads, road  
4 shoulders, and similarly disturbed and compacted areas; confine ground disturbance and  
5 habitat removal to the minimal area necessary to facilitate construction activities.
- 6 7. At least 15 days prior to any ground-disturbing activities, DWR will prepare and submit a  
7 relocation plan for USFWS's and CDFW's written approval. The relocation plan will contain  
8 the name(s) of the biologist(s) to relocate giant garter snakes, the method of relocation (if  
9 different than described), a map, and a description of the proposed release site(s) within  
10 300 feet of the work area or at a distance otherwise agreed to by USFWS and CDFW, and  
11 written permission from the landowner to use their land as a relocation site.
- 12 8. The perimeter of construction sites (except for work sites within areas of open water, like  
13 the Sacramento River) within or adjacent to giant garter snake habitat will be fenced with  
14 exclusion fencing by no more than 14 days prior to the start of construction activities (e.g.,  
15 staging, vegetation removal, grading) in a given area. The construction manager and the  
16 biologist will determine where exclusion fencing will be installed to minimize the potential  
17 for giant garter snake to enter the construction work area, including consideration of nearby  
18 vegetation that could facilitate giant garter snake entering the exclusion area. The placement  
19 of exclusion fencing will be determined, in part, by the locations of suitable habitat for the  
20 species. A conceptual fencing plan will be submitted to USFWS and CDFW prior to the start  
21 of construction and the exclusion fencing will be shown on the final construction plans. DWR  
22 will include the exclusion fence specifications including installation and maintenance  
23 criteria in the bid solicitation package special provisions. The exclusion fencing will remain  
24 in place for the duration of construction and will be regularly inspected and fully  
25 maintained. The biological monitor and construction manager will be responsible for  
26 checking the exclusion fencing around the work areas each day of construction to ensure  
27 that they are intact and upright. This will be especially critical during times of inclement  
28 weather that can damage the fencing. Repairs to the exclusion fence will be made within 24  
29 hours of discovery of a breach. Where construction access is necessary, gates will be  
30 installed in the exclusion fence and fencing will direct animals away from the work area to  
31 the extent practicable (e.g., fencing will flare out and turn back toward suitable habitat).
- 32 9. Immediately prior to the initiation of any vegetation clearing, ground-disturbing activities,  
33 and exclusion fence installation, the USFWS- and CDFW-approved biologist will survey  
34 suitable aquatic and upland habitat in the entire work site for the presence of giant garter  
35 snakes. If there is a lapse in construction in a work area for 7 days or more, these surveys  
36 will be repeated before activities resume.
- 37 10. If exclusionary fencing is found to be compromised, a survey of the exclusion fencing and the  
38 area inside the fencing will be conducted immediately preceding construction activity that  
39 occurs in delineated giant garter snake habitat or in advance of any activity that may result  
40 in take of the species. The biologist will search along exclusionary fences, in pipes, and  
41 beneath vehicles before they are moved.
- 42 11. If a giant garter snake is found in the work area, all work will cease in the vicinity of the  
43 snake, and the snake will be allowed to move of its own volition out of harm's way. If the  
44 snake does not move and it is deemed necessary to relocate the animal to prevent harm, the  
45 snake may be captured and relocated to suitable habitat a minimum of 200 feet outside of

- 1 the work area in accordance with the relocation plan, prior to resumption of construction  
2 activity.
- 3 12. Within 24 hours prior to construction activities, and dredging, requiring heavy equipment, a  
4 USFWS- and CDFW-approved biologist will survey all the activity area not protected by  
5 exclusionary fencing where giant garter snake could be present. This survey of the work  
6 area will be repeated if a lapse in construction or dredging activity of 2 weeks or greater  
7 occurs during the aestivation period (October 1 to May 1) or if the lapse in construction  
8 activity is more than 12 hours during active season (May 1 to October 1). If a giant garter  
9 snake is encountered during surveys or construction, cease activities until appropriate  
10 corrective measures have been completed, it has been determined that the giant garter  
11 snake will not be harmed, or the giant garter snake has left the work area.
- 12 13. The USFWS- and CDFW-approved biological monitor will help guide access and construction  
13 work around wetlands, active rice fields, and other sensitive habitats capable of supporting  
14 giant garter snake to minimize habitat disturbance and risk of injuring or killing giant garter  
15 snakes.
- 16 14. Store equipment in designated staging area areas at least 200 feet away from giant garter  
17 snake aquatic habitat to the extent practicable.
- 18 15. Visually check for giant garter snake under any vehicles or equipment that have been idle  
19 for more than 1 hour, or parked overnight, prior to moving the vehicles. Check any crevices  
20 or cavities in the work area where individuals may be present, including stockpiles that have  
21 been left for more than 24 hours where cracks/crevices may have formed.
- 22 For activities that will occur during the giant garter snake inactive season (October 2 to April  
23 30) and will last more than 2 weeks, DWR will implement the following additional avoidance  
24 and minimization measures.
- 25 16. For proposed activities that will occur within suitable aquatic giant garter snake habitat,  
26 during the inactive giant garter snake season (October 2–April 30), all aquatic giant garter  
27 snake habitat will be dewatered for at least 15 consecutive days prior to excavating or filling  
28 the dewatered habitat. Dewatering is necessary because aquatic habitat provides prey and  
29 cover for giant garter snake; dewatering serves to remove the attractant and increase the  
30 likelihood that giant garter snake will move to other available habitat. Any deviation from  
31 this measure will be done in coordination with and with approval of USFWS and CDFW.
- 32 17. Following dewatering of aquatic habitat, all potential impact areas that provide suitable  
33 aquatic or upland giant garter snake habitat will be surveyed for giant garter snake by the  
34 biologist. If giant garter snakes are observed, they will be passively allowed to leave the  
35 potential impact area. If the snake does not move of its own accord and it is determined  
36 necessary, the snake will be relocated in accordance with the approved relocation plan.
- 37 18. Once habitat is deemed free of giant garter snakes, exclusion fencing will be installed around  
38 the construction site so no snakes may reenter prior to or during construction.

### 39 ***Mitigation Impacts***

40 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
41 mitigation measure impacts. The analyses below consider the potential impacts associated with  
42 implementing the CMP and other mitigation measures. Methods for these analyses are presented in



1 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
2 *Measures*.

3 *Compensatory Mitigation*

4 The creation and enhancement of wetlands and other waters and habitat for special-status species  
5 at the I-5 ponds and on Bouldin Island under the project's CMP would affect modeled habitat for  
6 giant garter snake (Appendix 13C) from vegetation removal and grading to create the appropriate  
7 topography and soil conditions to establish or restore habitats. The CMP could also affect modeled  
8 habitat through tidal wetland habitat restoration and channel margin enhancement because  
9 potential areas identified generally overlap with modeled habitat (Appendix 3F, Section 3F.4.3.4.2).

10 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
11 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
12 vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located, which are  
13 not habitats for giant garter snake; therefore, there would not likely be any effects on this species.  
14 Site-specific analyses are not provided because locations of potential non-bank sites are not  
15 currently known.

16 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
17 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
18 management of agricultural areas but may also include natural communities in the study area  
19 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
20 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
21 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
22 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could potentially contain habitat for  
23 giant garter snake and management activities could affect this habitat and result in the disruption of  
24 normal behaviors, injury, and mortality. Site-specific analyses are not provided because locations of  
25 potential protection instruments are not currently known.

26 The CMP and site-specific permitting approvals would ensure that there is no significant loss in  
27 habitat or habitat value by adjusting the overall commitment (Appendix 3F, Section 3F.1, Section  
28 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General Design Guidelines*) and, therefore, reduce  
29 any habitat losses associated with the CMP to less than significant. These activities would also have  
30 the potential for injury, mortality, and the disruption of normal behaviors of individuals.  
31 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-3: *Develop and*  
32 *Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best*  
33 *Management Practices for Biological Resources* (Appendix 3B); and BIO-30: *Avoid and Minimize*  
34 *Impacts on Giant Garter Snake* would reduce potential impacts on the species by avoiding  
35 construction and maintenance activities in and adjacent to habitat to the extent possible and timing  
36 construction activities, installing exclusion fencing, conducting preconstruction surveys, and other  
37 protective measures to avoid and minimize the potential for injury and mortality.

38 Creation and enhancement of wetlands and other waters under the CMP have the potential to  
39 exacerbate bioaccumulation of methylmercury in giant garter snake by creating newly inundated  
40 wetlands. Because Bouldin Island and the I-5 ponds sites consist of existing managed and  
41 agricultural wetlands and ponds, wetland creation and enhancement are not expected to increase  
42 mercury methylation, relative to existing conditions. Monitoring and adaptive management plans as  
43 described in the CMP (Appendix 3F, Section 3F.7.2) would include mercury monitoring and adaptive  
44 management at Bouldin Island and the I-5 ponds to prevent increased mercury methylation, relative

1 to existing conditions. Mitigation Measure WQ-6, *Develop and Implement a Mercury Management and*  
2 *Monitoring Plan*, which contains measures to assess the amount of mercury at tidal restoration sites  
3 before project development, followed by appropriate design and adaptive management, would  
4 minimize the potential for any effects of increased methylmercury exposure due to tidal restoration.  
5 Therefore, implementation of the CMP would not be expected to have a significant adverse impact  
6 on giant garter snake.

7 Habitat creation and enhancement under the CMP has the potential to result in conditions that  
8 promote CHABs, which could result in impacts on giant garter snakes using created and/or  
9 enhanced wetland and aquatic habitats. High levels of microcystins in tissues and microcystin  
10 poisoning have been documented in other terrestrial species using aquatic habitats (Chen et al.  
11 2009:3317) and could affect giant garter snake if they forage in areas with conditions that promote  
12 CHABs. Monitoring and adaptive management plans as described in the CMP (Appendix 3F, Section  
13 3F.7.2) would include CHAB monitoring and adaptive management at Bouldin Island and the I-5  
14 ponds to prevent increased CHAB formation, relative to existing conditions. As discussed in Chapter  
15 9, *Water Quality*, tidal habitat creation is not expected to cause substantial additional *Microcystis*  
16 production. Therefore, implementation of the CMP would not result in increased CHAB formation  
17 that could cause substantial adverse impacts on giant garter snake, relative to existing conditions.

18 Herbicides would be applied at CMP wetland creation and enhancement sites to remove nonnative  
19 vegetation for site preparation and to support establishment of new plantings. Natural habitats  
20 contribute fewer pesticides to receiving waters than agricultural areas where pesticides are applied.  
21 Any newly created wetlands or enhanced natural habitat could also filter stormwater to remove  
22 solids and either improve or have no effect on pesticide concentrations in discharges to receiving  
23 waters, relative to existing conditions. As such, restoration areas are expected to somewhat reduce,  
24 rather than increase, runoff of pesticides in adjacent waterbodies. Environmental Commitment EC-  
25 14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would ensure  
26 that herbicides would be applied in such a manner as to prevent primary or secondary poisoning of  
27 giant garter snakes.

28 Creation and enhancement of wetlands are aimed at providing habitat for giant garter snake, which  
29 could increase the risk of selenium toxicity to the species. It is difficult to determine whether the  
30 effects of potential increases in selenium bioavailability associated with the CMP would lead to  
31 adverse effects. Potential effects of increased selenium exposure are likely low for giant garter  
32 snakes because they primarily forage on lower-trophic items with less potential to biomagnify  
33 selenium, and existing selenium concentrations in the Sacramento River watershed are low (Central  
34 Valley Regional Water Quality Control Board 1988:14). Modeled concentrations in largemouth bass  
35 tissue, used as a surrogate, under existing conditions in the Delta were below levels of concern  
36 (Appendix 9J), which suggests selenium concentrations in giant garter snakes are similarly low.  
37 Analysis included in Chapter 9 for Impact WQ-10 found that compensatory mitigation would not  
38 result in a measurable increase in selenium concentrations or selenium bioavailability. Furthermore,  
39 habitat loss is recognized as the primary threat to the giant garter snake and recovery criteria  
40 include providing sufficient high-quality habitat (U.S. Fish and Wildlife Service 2017c:I-12, I-14), so  
41 the benefit of increased habitat availability would outweigh the potential risk of a low-level increase  
42 in selenium exposure. Therefore, potential increased exposure to selenium resulting from  
43 restoration would not be expected to have a significant adverse impact on giant garter snake  
44 populations.

1 The impact on giant garter snake from the project alternatives with the CMP would be less than  
2 significant with mitigation.

3 **Mitigation Measure WQ-6, Develop and Implement a Mercury Management and**  
4 **Monitoring Plan**

5 See description of Mitigation Measure WQ-6 under Impact WQ-6 in Chapter 9.

6 Other Mitigation Measures

7 Some mitigation measures would involve ground disturbance and the use of heavy equipment, pile  
8 driving, or pesticides that would have the potential to result in loss of modeled giant garter snake  
9 habitat or result in injury, mortality, and disruption of normal behaviors of giant garter snake from  
10 ground disturbance, movement of construction vehicles, noise, vibration, or inadvertent discharge of  
11 construction-related fluids such as fuels, oils, and cement. The mitigation measures with potential to  
12 result in impacts on giant garter snake are similar to those discussed under Impact BIO-25: *Impacts*  
13 *of the Project on Western Pond Turtle*. Impacts on giant garter snake resulting from mitigation  
14 measures would be similar to construction effects of the project alternatives in certain construction  
15 areas and would contribute to giant garter snake impacts of the project alternatives.

16 The impacts of habitat loss, ground disturbance, noise, vibration, and exposure to hazardous  
17 materials on giant garter snake would be reduced through the CMP and environmental  
18 commitments, as detailed under Impact BIO-25. In addition, Mitigation Measure BIO-30: *Avoid and*  
19 *Minimize Impacts on Giant Garter Snake* would require species-specific measures to reduce these  
20 impacts. Therefore, impacts on giant garter snake from implementation of other mitigation  
21 measures would be reduced to less than significant.

22 Overall, the impacts on giant garter snake from construction of compensatory mitigation and  
23 implementation of other mitigation measures, combined with project alternatives, would not change  
24 the impact conclusion of less than significant with mitigation.

25 **Impact BIO-31: Impacts of the Project on Western Yellow-Billed Cuckoo**

26 The methods for the analysis of effects on western yellow-billed cuckoo appear in Section 13.3.1.1,  
27 and information on the species' life history and habitat suitability model are presented in the species  
28 account in Appendix 13B, Section 13B.56, *Western Yellow-Billed Cuckoo*.

29 **All Project Alternatives**

30 Construction

31 The construction of all the project alternatives would result in the permanent and temporary loss of  
32 western yellow-billed cuckoo modeled migratory habitat, including potential indirect effects on  
33 habitat. The loss of habitat would primarily occur as a result of levee improvements, new roads and  
34 road improvements, and construction of the intakes (Appendix 13C). The central alignment  
35 alternatives (Alternatives 1, 2a, 2b, and 2c) would result in greater impacts on western yellow-billed  
36 cuckoo modeled migratory habitat compared to the eastern alignment alternatives (Alternatives 3,  
37 4a, 4b, and 4c) and the Bethany Reservoir alignment (Alternative 5) largely because of the levee  
38 improvements on Bouldin Island and road improvements throughout the central alignment. Acres of  
39 permanent and temporary impacts on modeled migratory habitat for western yellow-billed

cuckoo are shown in Table 13-68. The losses of western yellow-billed cuckoo modeled migratory habitat would be from vegetation removal in advance of grading and excavation for the construction of project infrastructure. Environmental Commitment EC-14: *Construction Best Management Practices for Special-Status Species* would ensure that temporarily disturbed areas are restored (Appendix 3B).

**Table 13-68. Impacts on Modeled Migratory Habitat for Western Yellow-Billed Cuckoo by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	48.92	12.77	61.69
2a	48.44	14.84	63.28
2b	44.75	13.96	58.71
2c	46.57	14.40	60.97
3	9.34	7.62	16.96
4a	10.46	8.22	18.68
4b	6.77	7.34	14.11
4c	8.59	7.77	16.36
5	9.69	6.80	16.49

<sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see discussion in Section 13.3.1.2.

Habitat fragmentation is not expected to affect migratory western yellow-billed cuckoos because modeled migratory habitat is not limited in the study area (Appendix 13B, Section 13B.56, Figure 13B.56-1) and migrating birds can use small habitat patches and easily move from one location to the next during migration. Western yellow-billed cuckoos are not known to nest in the study area, and the riparian habitat patches are not large enough, nor do they have the floodplain function necessary, to support breeding (Laymon and Halterman 1989:274–275; Laymon 1998:57; Greco 2013:711–715); therefore, the project would not affect nesting western yellow-billed cuckoos. However, because there is a known breeding population on the Sacramento River north of the study area (Dettling et al. 2015:7), it is assumed that individuals may migrate through the region.

Construction-related noise and visual disturbances could disrupt foraging behaviors and reduce the functions of migratory habitat for cuckoos. Intake construction would require the use of loud, heavy equipment within the construction site as well as along the access roads to the site. Pile driving would be required for intake construction which would create noise and vibration effects in and adjacent to modeled migratory habitat. While 60 A-weighted decibels (dBA) has been used as the standard noise threshold for birds (California Department of Transportation 2016:87), this standard is generally applied during the nesting season, when birds are more vulnerable to behavioral modifications that can cause nest failure. There is evidence, however, that migrating birds avoid noisy areas during migration (McClure et al. 2013:7). Construction-related night lighting may also have the potential to affect migrating cuckoos. While there is no data on effects of night lighting on the species, studies show that birds of other species are attracted to artificial lights and this may disrupt their behavioral patterns or cause collision-related fatalities (Gauthreaux and Belser 2006:67–86). All lights used during nighttime construction would be downcast, cut-off type fixtures with non-glare finishes, natural light qualities, and minimum intensity. Construction-related lighting would be shielded and oriented such that the immediate surroundings would not be subject to extremes in the levels of light; however, these types of light generate an ambient nighttime

1 luminescence that is visible from a distance (Chapter 18, *Aesthetics*, Impact AES-4: *Create New*  
2 *Sources of Substantial Light or Glare That Would Adversely Affect Daytime or Nighttime Views of the*  
3 *Construction Areas or Permanent Facilities*). Construction activities could expose western yellow-  
4 billed cuckoos to dust if present in or adjacent to work areas. Environmental Commitments EC-1:  
5 *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management*  
6 *Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11:  
7 *Fugitive Dust Control*; and EC-14: *Construction Best Management Practices for Biological Resources*  
8 (Appendix 3B) would reduce these potential impacts by (1) training construction staff on protecting  
9 the species, reporting requirements, and the ramifications for not following these measures; (2)  
10 implementing spill prevention and containment plans that would avoid material spills that could  
11 affect suitable habitat; and (3) having a biological monitor present that would ensure that non-  
12 disturbance buffers are intact and all protective measures are being implemented, where applicable.

13 No CNDDDB (California Department of Fish and Wildlife 2020a) occurrence records of western  
14 yellow-billed cuckoo fall within the construction footprint for any of the alternatives. The nearest  
15 CNDDDB occurrence (occurrence #195) to the project alternatives was recorded along Snodgrass  
16 Slough, which is approximately 1.5 miles northeast of a shaft on New Hope Tract for the central  
17 alignments (Alternatives 1, 2a, 2b, and 2c) and approximately 2.5 miles northeast of a shaft on New  
18 Hope Tract for the eastern alignment (Alternatives 3, 4a, 4b, and 4c) and the Bethany Reservoir  
19 alignment (Alternative 5) (California Department of Fish and Wildlife 2020a). This occurrence is  
20 presumed to be a migrating individual, as breeding status was not confirmed (California Department  
21 of Fish and Wildlife 2020a).

22 Field investigations would be conducted prior to and during construction under all project  
23 alternatives to more specifically identify appropriate construction methods and design criteria  
24 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
25 existing utilities, and address the establishment of geological and groundwater monitoring  
26 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
27 would involve a variety of ground-disturbing activities that would vary in duration from several  
28 hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
29 Construction Authority 2022a, 2022b) and could result in impacts on habitat and the disruption of  
30 normal behaviors of western yellow-billed cuckoo. Geotechnical investigations associated with the  
31 tunnels for all project alternatives, which include CPTs and soil borings, would result in impacts on  
32 habitat (Appendix 13C). The West Tracy Fault Study and the Bethany Fault Study investigations  
33 would not affect modeled habitat for western yellow-billed cuckoo. The following field  
34 investigations would be conducted within proposed surface construction footprints of project  
35 facilities (including portions of tunnel alignments) and would temporarily affect habitat: test  
36 trenches, CPTs, soil borings, ERT, groundwater testing and monitoring, monument installation, pilot  
37 studies for settlement, agronomic testing, and utility potholing. These temporary impacts are not  
38 characterized as an additional loss of habitat because impacts for these locations have already been  
39 quantified within the construction-related footprints but could still result in the potential for the  
40 disruption of normal behaviors of western yellow-billed cuckoo, as discussed above for conveyance  
41 facility construction. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2:  
42 *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
43 *Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
44 *Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1)  
45 training construction staff on protecting the species, reporting requirements, and the ramifications  
46 for not following these measures; (2) implementing spill prevention and containment plans that

1 would avoid material spills that could affect suitable habitat; and (3) having a biological monitor  
2 present that would ensure that non-disturbance buffers are intact and all protective measures are  
3 being implemented, where applicable. Noise and visual disturbances from helicopter surveys to  
4 identify buried groundwater and natural gas wells throughout the project area and pile installation  
5 test methods at the north Delta intakes may affect western yellow-billed cuckoos migrating through  
6 the study area, as described above under construction-related effects.

### 7 Operations

8 The operation of project facilities would not require ground disturbance or result in additional  
9 habitat loss, but project operations would generate small levels of noise, have permanent light  
10 sources, and require the periodic presence of staff and vehicle traffic. Noise from the operation of  
11 the water conveyance facilities would not be discernably higher than existing conditions (Chapter  
12 24, *Noise and Vibration*, Section 24.4.3.2, *Impacts of the Project Alternatives Related to Noise and*  
13 *Vibration*) and the periodic presence of staff would not be expected to affect migrating western  
14 yellow-billed cuckoos. Permanent lighting at project facilities could extend into western yellow-  
15 billed cuckoo migratory habitat; however, as stated in Chapter 3, Section 3.4.12, *Fencing and*  
16 *Lighting*, permanent lighting at project facilities would be motion activated, downcast, cut-off type  
17 fixtures with non-glare finishes, and therefore permanent facilities would remain dark the majority  
18 of the time at night, which would minimize the potential for this impact.

19 Power for construction and operation of the conveyance facilities has been designed to use existing  
20 power lines and underground conduit to the extent feasible under all project alternatives. Most new  
21 project lines would be placed on existing poles and towers and therefore would not substantially  
22 alter the existing landscape. New aboveground high-voltage transmission and SCADA lines would be  
23 constructed to power the Southern Complex under Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c and  
24 the Bethany Complex under Alternative 5 (Chapter 3, Figure 3-13 and Figure 3-14), where the  
25 landcover in that region is primarily grassland and agriculture with minimal riparian vegetation that  
26 would support migrating cuckoos.

27 The western yellow-billed cuckoo migrates through the study area during periods of relatively high  
28 visibility and clear weather conditions, thus reducing collision risk from daily use patterns or  
29 seasonal migration flights. In addition, western yellow-billed cuckoo wing shape is characterized by  
30 low wing loading and a moderate aspect ratio, making the species moderately maneuverable  
31 (Bevanger 1998:69) and able to successfully negotiate around overhead wires that it may encounter  
32 and avoid collisions, especially during high-visibility conditions. In addition, the western yellow-  
33 billed cuckoo is an uncommon migrant in the study area. Therefore, it is highly unlikely that this  
34 species would experience bird strikes at project transmission lines.

35 Changes in water operations under all project alternatives have the potential to exacerbate  
36 bioaccumulation of methylmercury in western yellow-billed cuckoo. Methylmercury can be  
37 transported from aquatic to adjacent terrestrial foodwebs through ingestion of aquatic prey items,  
38 where it can biomagnify and expose songbirds to high concentrations in large insect prey (Cristol et  
39 al. 2008:335). Largemouth bass was used as an indicator species for analysis of impacts from  
40 changes in operations from the construction of the water conveyance facilities because they are  
41 good indicators of mercury contamination throughout the aquatic foodweb (Wood et al. 2010:67).  
42 Modeled effects of mercury concentrations from changes in operations of water conveyance  
43 facilities on largemouth bass did not differ substantially from existing conditions (Appendix 9H,  
44 *Mercury*). Even though western yellow-billed cuckoos do not use aquatic habitats, the lack of

1 substantial change in aquatic foodweb mercury concentrations indicates that mercury  
2 concentrations in adjacent riparian foodwebs would also not increase appreciably. In addition,  
3 western yellow-billed cuckoo is present only for a short time during migration, further reducing the  
4 risk of mercury bioaccumulation; therefore, these results indicate that bioavailability of  
5 methylmercury to western yellow-billed cuckoo would not measurably increase as a result of  
6 project operation.

7 Microcystin toxins originate in aquatic systems and can be transported through foodwebs through  
8 consumption (Moy et al. 2016:A). Microcystins have also been found in terrestrial foodwebs, such as  
9 spiders and songbirds in riparian habitats, likely through consumption of emergent aquatic insects  
10 (Moy et al. 2016:A, E), and can impact western yellow-billed cuckoos if they forage in or near  
11 habitats with conditions that promote CHABs. Operation of all project alternatives is not expected to  
12 substantially change the five factors that could create conditions more conducive to CHAB formation  
13 (i.e., temperature, residence time, nutrients, water velocities and associated turbulence and mixing,  
14 and water clarity and associated irradiance) relative to existing conditions upstream of the Delta or  
15 within the Delta (Chapter 9, *Water Quality*). The water quality modeling results show a potential for  
16 increased residence time in some locations and months within the central Delta, namely Discovery  
17 Bay where residence times are already very long, which could contribute to increased *Microcystis*  
18 bloom size in some years at these locations if the remaining four environmental factors were also at  
19 levels conducive to forming CHABs. Nevertheless, based on known *Microcystis* dynamics in the Delta  
20 a small increase of residence time at Discovery Bay would not cause *Microcystis* blooms to  
21 substantially increase in size or last substantially longer, relative to existing conditions. Because the  
22 project alternatives, through their effects on the five factors potentially associated with CHABs in the  
23 Delta, are not expected to cause Delta CHABs to be substantially larger in size, and because bloom  
24 size does not necessarily dictate toxin concentration in the water, the project alternatives are not  
25 expected to substantially increase microcystin or any other cyanotoxins in the Delta that could cause  
26 a substantial adverse impact on western yellow-billed cuckoo, relative to existing conditions.

27 Current use and legacy pesticides have the potential to bioaccumulate in the food items of western  
28 yellow-billed cuckoo. Impacts of all project alternatives on pesticides in the Delta were analyzed in  
29 Chapter 9. Operation of all project alternatives and potential runoff from project facilities would not  
30 result in substantial increases in pesticide concentrations in Delta waters or in Delta outflows, and  
31 would not result in land-use changes that would increase use of pesticides in or adjacent to habitats  
32 used by western yellow-billed cuckoo, relative to existing conditions. Therefore, the project  
33 alternatives would not substantially reduce prey availability or increase pesticide exposure to  
34 western yellow-billed cuckoo.

35 Changes in water operations under all project alternatives is not expected to affect western yellow-  
36 billed cuckoo habitat, but there is some potential to exacerbate bioaccumulation of selenium in  
37 western yellow-billed cuckoo. Modeled selenium concentrations in the eggs of insect-eating birds,  
38 such as western yellow-billed cuckoo, were below the level of concern and did not differ  
39 substantially from existing conditions under all alternatives (Appendix 9J, *Selenium*). Therefore, the  
40 project alternatives are not anticipated to substantially increase the risk of selenium contamination  
41 in western yellow-billed cuckoo.

42 Upstream of the study area, yellow-billed cuckoos primarily use large patches of willow-cottonwood  
43 riparian forest along the Sacramento and Feather Rivers for nesting. Preferred nesting habitat  
44 conditions for cuckoos are created by continuing habitat succession caused by meandering streams  
45 that allow constant erosional and depositional processes (Laymon 1998:272–273; Greco 2013:711–

1 715). Habitat requirements and modeled migratory habitat are discussed in detail in Appendix 13B,  
2 Section 13B.56. Chapter 5, *Surface Water*, details the hydrologic modeling methods (Appendix 5A,  
3 *Modeling Technical Appendix*, Section B, *Hydrology and Systems Operations Modeling*) and results  
4 (Appendix 5A, Section B, Attachment 3, *CalSim 3 Modeling Results*) with respect to flows within and  
5 upstream of the Delta. Based on hydrologic modeling results, all project alternatives (Alternatives 1,  
6 2a, 2b, 3c, 3, 4a, 4b, 4c, and 5) would have similar impact levels and are discussed together. Modeled  
7 flows under all project alternatives are not expected to change substantially beyond the existing  
8 variation in flows. Thus, the project is not anticipated to alter riparian vegetation or the  
9 hydrogeomorphic processes which create western yellow-billed cuckoo breeding habitat upstream  
10 of the study area, relative to existing conditions.

### 11 Maintenance

12 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
13 in periodic disturbances that may affect western yellow-billed cuckoo. Maintenance activities at the  
14 north Delta intakes (all project alternatives) would include semiannual general and ground  
15 maintenance (e.g., mowing, vegetation trimming, herbicide application), annual sediment and debris  
16 removal at intakes, and periodic maintenance of the intake gates and associated structures  
17 approximately every 1 to 5 years. Maintenance activities at launch, reception, and maintenance  
18 shafts along the central alignment (Alternatives 1, 2a, 2b, and 2c), the eastern alignment  
19 (Alternatives 3, 4a, 4b, and 4c), and the Bethany Reservoir alignment (Alternative 5) would include  
20 similar semiannual general and ground maintenance in addition to daily inspections by vehicle.  
21 Existing access roads in the vicinity of the intakes and shafts would be repaved every 15 years.  
22 Maintenance activities could reduce the functions of western yellow-billed cuckoo migratory habitat  
23 adjacent to work areas if these activities take place during migration (between May 15 and  
24 September 1). Maintenance activities would generally be conducted during the day, except for  
25 emergency maintenance, and would therefore not require additional lighting. Although there may be  
26 residual noise effects from maintenance activities extending into western yellow-billed cuckoo  
27 habitat, this is not likely to result in a significant impact on western yellow-billed cuckoos because  
28 these activities are periodic and migratory habitat is plentiful in the study area; therefore,  
29 individuals can readily avoid the disturbance during migration.

### 30 **CEQA Conclusion—All Project Alternatives**

31 Construction, operations, and maintenance of the water conveyance facilities under all project  
32 alternatives would result in impacts on western yellow-billed cuckoo through the permanent and  
33 temporary loss of modeled habitat of a special-status species and the potential for disruption of  
34 normal behaviors if individuals are present in the study area. For all project alternatives, changes in  
35 water operations would not be expected to result in a measurable increase in mercury or selenium  
36 bioavailability or increased pesticide or microcystins affecting western yellow-billed cuckoo, and  
37 would not result in changes in upstream flows. The temporary impacts on habitat and the potential  
38 impacts of the disruption of normal behavior from project construction, operations, and  
39 maintenance would be reduced by Environmental Commitments EC-1: *Conduct Worker Awareness*  
40 *Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and*  
41 *Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*;  
42 and EC-14: *Construction Best Management Practices for Special-Status Species* (Appendix 3B);  
43 however, even with these commitments, the impacts of the project alternatives on western yellow-  
44 billed cuckoo would be significant. The implementation of the CMP would be required to offset the



1 loss of migratory habitat (Appendix 3F, Section 3F.3.3.1 and Attachment 3F.1, Table 3F.1-3, CMP-16:  
2 *Western Yellow-Billed Cuckoo Habitat*), which would mitigate the impact associated with habitat loss  
3 to less than significant. Mitigation Measures AES-4b: *Minimize Fugitive Light from Portable Sources*  
4 *Used for Construction*; AES-4c: *Install Visual Barriers along Access Routes, Where Necessary, to Prevent*  
5 *Light Spill from Truck Headlights toward Residences* (Chapter 18); NOI-1: *Develop and Implement a*  
6 *Noise Control Plan* (Chapter 24); BIO-2b: *Avoid and Minimize Impacts on Biological Resources from*  
7 *Maintenance Activities*; BIO-2c: *Electrical Power Line Support Placement*; and BIO-31: *Avoid and*  
8 *Minimize Impacts on Western Yellow-Billed Cuckoo* would be required to avoid and minimize the  
9 potential for disruption of normal behaviors, and disturbances to habitat. The impacts on western  
10 yellow-billed cuckoo from the project alternatives would be less than significant with mitigation  
11 because the aforementioned measures would replace lost habitat and reduce direct effects on the  
12 species, including habitat, noise, and visual disturbances, by providing environmental awareness  
13 training to construction personnel, by implementing protective measures during maintenance  
14 activities, and species-specific avoidance measures during construction.

### 15 **Mitigation Measure CMP: Compensatory Mitigation Plan**

16 The CMP (see Impact BIO-1 for a summary discussion of the CMP) would offset the loss of  
17 migratory habitat (Appendix 3F, Section 3F.3.2.3; Appendix 3F, Section 3F.3.3.1 and Attachment  
18 3F.1, Table 3F.1-3, CMP-16: *Western Yellow-Billed Cuckoo Habitat*) by creating riparian habitat  
19 on Bouldin Island and at the I-5 ponds, and managing these areas in perpetuity. Channel margin  
20 restoration would include riparian plantings on rock benches (Appendix 3F, Section 3F.4.3.3.3)  
21 that may provide migratory habitat for western yellow-billed cuckoo.

### 22 **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for** 23 **Construction**

24 See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

### 25 **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary,** 26 **to Prevent Light Spill from Truck Headlights toward Residences**

27 See description of Mitigation Measure AES-4c under Impact AES-4 in Chapter 18.

### 28 **Mitigation Measure NOI-1: Develop and Implement a Noise Control Plan**

29 See description of Mitigation Measure NOI-1 under Impact NOI-1 in Chapter 24.

### 30 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 31 **Resources from Maintenance Activities**

32 See description of Mitigation Measure BIO-2b under Impact BIO-2.

### 33 **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

34 See description of Mitigation Measure BIO-2c under Impact BIO-2.

1           **Mitigation Measure BIO-31: Avoid and Minimize Impacts on Western Yellow-Billed**  
2           **Cuckoo**

3           ***All Project Alternatives***

4           The following measures will be required for all construction activities occurring between May  
5           15 through September 1 to avoid and minimize impacts on western yellow-billed cuckoo.

- 6           1. Prior to the construction, a noise expert will create a sound level contour map showing the  
7           60 dBA sound level contour specific to the type and location of construction to occur in the  
8           area.
- 9           2. Two weeks prior to construction, a USFWS- and CDFW-approved biologist will conduct daily  
10           surveys, consistent with a USFWS- or CDFW-approved survey protocol (e.g., Halterman et al.  
11           2015:9-42, or more current guidance), in suitable habitat where construction-related noise  
12           levels could exceed 60 dBA equivalent sound level ( $L_{eq}$ ) (1 hour).
- 13           3. If a yellow-billed cuckoo is found, construction activities will be limited such that sound will  
14           not exceed 60 dBA within 500 feet of the habitat being used until the USFWS- and CDFW-  
15           approved biologist has confirmed that the bird has left the area.
- 16           4. If surveys find cuckoos in an area where vegetation will be removed, vegetation removal  
17           will be conducted when the USFWS- and CDFW-approved biologist has confirmed that  
18           cuckoos are not present within 500 feet of vegetation removal activities.
- 19           5. Portable and stationary equipment will be located, stored, and maintained as far as possible,  
20           with a minimum distance of 500 feet, from suitable western yellow-billed cuckoo habitat.
- 21           6. All lights will be screened and directed down toward work activities and away from  
22           migratory habitat. A biological monitor will ensure that lights are properly directed at all  
23           times during construction.

24           ***Mitigation Impacts***

25           As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
26           mitigation measure impacts. The analyses below consider the potential impacts associated with  
27           implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
28           Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
29           *Measures*.

30           *Compensatory Mitigation*

31           The creation and enhancement of wetlands, as well as habitat for special-status species under the  
32           project's CMP would affect western yellow-billed cuckoo through the permanent and temporary loss  
33           of modeled migratory habitat (Appendix 13C) from vegetation removal and grading to create the  
34           appropriate topography and soil conditions to establish or restore habitats.

35           In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
36           enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
37           vernal pool complexes, alkaline seasonal wetlands, or grasslands are located, which do not provide  
38           habitat for western yellow-billed cuckoo and therefore there would not likely be any effects on the  
39           species. Site-specific analyses are not provided because locations of potential non-bank sites are not  
40           currently known.

1 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
2 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
3 management of agricultural areas but may also include natural communities in the study area  
4 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
5 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
6 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
7 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could support suitable migratory  
8 habitat for western yellow-billed cuckoo and management activities within occupied habitat could  
9 result in the disruption of normal behaviors, injury, or mortality. Site-specific analyses are not  
10 provided because locations of potential protection instruments are not currently known.

11 The CMP and site-specific permitting approvals would account for any losses of western yellow-  
12 billed cuckoo migratory habitat from habitat creation by adjusting the overall commitment of  
13 riparian creation (Appendix 3F, Section 3F.1, *Introduction*, Section 3F.2.4, and Attachment 3F.1,  
14 Table 3F.1-2, CMP-0: *General Design Guidelines*) and therefore reduce any habitat losses associated  
15 with the CMP to less than significant. The creation and enhancement activities would also have the  
16 potential for the disruption of normal behaviors of individuals if restoration activities take place  
17 during migration (between June 15 and September 1), as described above under construction-  
18 related effects. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2:  
19 *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
20 *Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14:  
21 *Construction Best Management Practices for Special-Status Species* (Appendix 3B) and Mitigation  
22 Measure BIO-31: *Avoid and Minimize Impacts on Western Yellow-Billed Cuckoo* would mitigate the  
23 potential disruption of normal behaviors of individuals to less than significant. These impacts would  
24 be less than significant with mitigation because the aforementioned measures would (1) train  
25 construction staff on protecting the species, the requirements for avoiding impacts, and the  
26 ramifications for not following these measures; (2) minimize dust; (3) implement spill prevention  
27 and containment plans that would avoid material spills that could affect habitat; (4) prior to and  
28 during implementing restoration and enhancement ground disturbance, establish protective buffers  
29 around occupied habitat; and (5) have a biological monitor present that would ensure that non-  
30 disturbance buffers are intact and all protective measures are being implemented where applicable.

31 Creation and enhancement of wetlands under the CMP have the potential to exacerbate  
32 bioaccumulation of mercury in western yellow-billed cuckoo by creating newly inundated wetlands  
33 which can produce the biogeochemical conditions to methylate mercury existing in Delta soils.  
34 Methylmercury can subsequently be transported to adjacent terrestrial foodwebs through ingestion  
35 of aquatic insects (Cristol et al. 2008:335). Potential effects of increased methylmercury exposure  
36 are likely low for western yellow-billed cuckoo because they migrate through the Delta, spending  
37 only a short period of time which reduces the risk of bioaccumulation. Because Bouldin Island and  
38 the I-5 ponds sites consist of existing managed and agricultural wetlands and ponds, wetland  
39 creation and enhancement are not expected to increase mercury methylation, relative to existing  
40 conditions. Monitoring and adaptive management plans as described in the CMP (Appendix 3F,  
41 Section 3F.7.2, *Monitoring*) would include mercury monitoring and adaptive management at Bouldin  
42 Island and the I-5 ponds to prevent increased mercury methylation, relative to existing conditions.  
43 Mitigation Measure WQ-6: *Develop and Implement a Mercury Management and Monitoring Plan*  
44 would involve the development of a Mercury Management and Monitoring Plan (MMMP) to guide  
45 tidal habitat design. The MMMP would require project-specific assessments of new tidal habitats,  
46 integration of design measures to minimize mercury methylation, and site monitoring and

1 reporting, which would further minimize the potential for any effects of increased methylmercury  
2 exposure at migratory habitat adjacent to tidal restoration sites. Therefore, potential impact of  
3 increased exposure to methylmercury resulting from wetland creation and enhancement on  
4 western yellow-billed cuckoo populations would be less than significant with mitigation.

5 Habitat creation and enhancement under the CMP has the potential to result in conditions that  
6 promote CHABs, which could result in impacts on western yellow-billed cuckoo using habitat  
7 adjacent to created and/or enhanced wetland and aquatic habitats. Microcystins have been found in  
8 terrestrial foodwebs, such as spiders and songbirds in riparian habitats, likely through consumption  
9 of emergent aquatic insects (Moy et al. 2016:A, E), and can affect western yellow-billed cuckoos if  
10 they forage in or near habitats with conditions that promote *Microcystis* blooms. Monitoring and  
11 adaptive management plans as described in the CMP (Appendix 3F, Section 3F.7.2) would include  
12 CHAB monitoring and adaptive management at Bouldin Island and the I-5 ponds to prevent  
13 increased CHAB formation, relative to existing conditions. As discussed in Chapter 9, tidal habitat  
14 creation is not expected to cause substantial additional *Microcystis* production that could be  
15 transported to adjacent migratory habitat. Therefore, implementation of the CMP would not result  
16 in increased CHAB formation that could cause substantial adverse impacts on western yellow-billed  
17 cuckoo, relative to existing conditions.

18 Herbicides would be applied at CMP creation and enhancement sites to remove nonnative  
19 vegetation for site preparation and to support the establishment of new plantings. Natural habitats  
20 contribute fewer pesticides to receiving waters than agricultural areas where pesticides are applied.  
21 Any newly created wetlands or enhanced natural habitat could also filter stormwater to remove  
22 solids and either improve or have no effect on pesticide concentrations in discharges to receiving  
23 waters, relative to existing conditions. As such, restoration areas are expected to somewhat reduce,  
24 rather than increase, runoff of pesticides into adjacent waterbodies. Environmental Commitment  
25 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would ensure  
26 that herbicides would be applied in such a manner as to prevent primary or secondary poisoning of  
27 western yellow-billed cuckoo.

28 CMP habitat creation and enhancement may result in mobilization of selenium in Delta sediments,  
29 which could increase the risk of selenium toxicity to western yellow-billed cuckoo. It is difficult to  
30 determine whether the effects of potential increases in selenium bioavailability associated with the  
31 CMP would lead to adverse effects. Potential effects of increased selenium exposure are likely low  
32 for western yellow-billed cuckoos because they spend only a short period of time migrating through  
33 the Delta, which reduces the risk of bioaccumulation. Existing selenium concentrations in the  
34 Sacramento River watershed are low (Central Valley Regional Water Quality Control Board  
35 1988:14), and modeled concentrations in insect-eating bird eggs under existing conditions in the  
36 Delta were below levels of concern for other bird species (Appendix 9J). Analysis included in  
37 Chapter 9 for Impact WQ-10: *Effects on Selenium Resulting from Facility Operations* found that  
38 compensatory mitigation would not result in a measurable increase in selenium concentrations or  
39 selenium bioavailability. Therefore, the potential impact of increased exposure to selenium resulting  
40 from restoration on western yellow-billed cuckoo populations would be less than significant. The  
41 impact on western yellow-billed cuckoo from the project alternatives with the CMP would be less  
42 than significant with mitigation.

### 1 Other Mitigation Measures

2 Some mitigation measures would involve ground disturbance, the use of heavy equipment, pile  
3 driving, or pesticides that would have the potential to expose western yellow-billed cuckoo to  
4 excessive noise, visual disturbance, dust, and hazardous materials that could cause loss of modeled  
5 habitat, disruption of normal behaviors, and injury or mortality. The mitigation measures with  
6 potential to result in impacts on western yellow-billed cuckoo are: Mitigation Measures BIO-2:  
7 *Electrical Power Line Support Placement*; AG-3: *Replacement or Relocation of Affected Infrastructure*  
8 *Supporting Agricultural Properties*; AES-1a: *Install Visual Barriers between Construction Work Areas*  
9 *and Sensitive Receptors*; AES-1c: *Implement Best Management Practices to Implement Project*  
10 *Landscaping Plan*; AES-4c: *Install Visual Barriers along Access Routes, Where Necessary, to Prevent*  
11 *Light Spill from Truck Headlights toward Residences*; AQUA-1a: *Develop and Implement an*  
12 *Underwater Sound Control and Abatement Plan*; PH-1b: *Develop and Implement a Mosquito*  
13 *Management Plan for Compensatory Mitigation Sites on Bouldin Island and at I-5 Ponds*; CUL-2:  
14 *Conduct a Survey of Inaccessible Properties to Assess Eligibility, Determine if These Properties Will Be*  
15 *Adversely Affected by the Project, and Develop Treatment to Resolve or Mitigate Adverse Impacts*; and  
16 *AQ-9: Develop and Implement a GHG Reduction Plan to Reduce GHG Emissions from Construction and*  
17 *Net CVP Operational Pumping to Net Zero*. Impacts on western yellow-billed cuckoo resulting from  
18 the implementation of mitigation measures would be similar to construction effects of the project  
19 alternatives in certain construction areas and would contribute to western yellow-billed cuckoo  
20 impacts of the project alternatives.

21 However, the impacts of habitat loss, ground disturbance, noise, visual disturbance, and exposure to  
22 dust or hazardous materials on western yellow-billed cuckoo would be reduced through the CMP;  
23 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
24 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
25 *Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; EC-14: *Construction Best*  
26 *Management Practices for Biological Resources*; and Mitigation Measures NOI-1: *Develop and*  
27 *Implement a Noise Control Plan*; and BIO-31: *Avoid and Minimize Impacts on Western Yellow-Billed*  
28 *Cuckoo*. Therefore, impacts on western yellow-billed cuckoo from implementation of other  
29 mitigation measures would be reduced to less than significant.

30 Overall, the impacts on western yellow-billed cuckoo from the construction of compensatory  
31 mitigation and implementation of other mitigation measures, combined with project alternatives,  
32 would not change the impact conclusion of less than significant with mitigation.

### 33 **Impact BIO-32: Impacts of the Project on California Black Rail**

34 The methods for the analysis of effects on California black rail appear in Section 13.3.1.1, and  
35 information on the species' life history and habitat suitability model are presented in the species  
36 account in Appendix 13B, Section 13B.57, *California Black Rail*.

### 37 **All Project Alternatives**

#### 38 Construction

39 The construction of all the project alternatives would result in impacts on modeled habitat for  
40 California black rail and the potential for the disruption of normal behaviors, and injury, and  
41 mortality during construction. The loss of modeled habitat would primarily occur as a result of levee  
42 improvements and new roads and road improvements (Appendix 13C). However, the habitat model

1 overestimates suitable habitat for California black rail and therefore impacts on modeled habitat are  
 2 also overestimated. Much of the modeled habitat that occurs within the construction footprint for  
 3 levee and road improvements on Bouldin Island under the central alternatives (Alternatives 1, 2a,  
 4 2b, and 2c) and Lower Roberts Island under the eastern alternatives (Alternatives 3, 4a, 4b, and 4c)  
 5 and the Bethany Reservoir alternative (Alternative 5) consists of existing levees and levee roads  
 6 with revetment and sparse grassland vegetation landcover types that do not provide suitable habitat  
 7 for California black rail; however, some areas of suitable wetland vegetation appear to be present at  
 8 the base of these levees. Acres of permanent and temporary impacts on modeled habitat for  
 9 California black rail are shown in Table 13-69. Environmental Commitment EC-14: *Construction Best*  
 10 *Management Practices for Special-Status Species* would ensure that temporarily disturbed areas are  
 11 restored (Appendix 3B).

12 **Table 13-69. Impacts on Modeled Habitat for California Black Rail by Alternative**

Alternative	Permanent Impacts— Delta (acres) <sup>a</sup>	Permanent Impacts— Mid-Channel Island Primary (acres) <sup>a</sup>	Permanent Impacts— Mid-Channel Island Secondary (acres) <sup>a</sup>	Temporary Impacts— Delta (acres)	Temporary Impacts— Mid-Channel Island Primary (acres)	Temporary Impacts— Mid-Channel Island Secondary (acres)	Total (acres)
1	7.66	0.00	0.00	6.38	0.47	0.00	14.51
2a	5.27	0.00	0.00	8.90	0.47	0.00	14.64
2b	4.04	0.00	0.00	7.31	0.47	0.00	11.82
2c	5.27	0.00	0.00	8.63	0.47	0.00	14.37
3, 4c	11.68	0.00	0.00	3.70	0.22	0.00	15.6
4a	11.68	0.00	0.00	3.97	0.22	0.00	15.87
4b	10.46	0.00	0.00	2.38	0.22	0.00	13.06
5	12.09	0.00	0.00	3.39	0.27	0.00	15.75

13 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 14 discussion in Section 13.3.1.2.  
 15

16 Ground disturbance (e.g., grubbing during site preparation) in suitable habitat could crush eggs or  
 17 kill nestlings in California black rail nests. Construction-generated noise and vibration near active  
 18 nests could cause adults to abandon eggs or recently hatched young if they perceive such  
 19 disturbances as a threat. Night lighting may also have the potential to affect the behavior of nesting  
 20 California black rails. All lights used during nighttime construction would be downcast, cut-off type  
 21 fixtures with non-glare finishes, natural light qualities, and minimum intensity. Construction-related  
 22 lighting would be shielded and oriented in such a manner so as not to subject the immediate  
 23 surroundings to extremes in the levels of light, however, these types of light generate an ambient  
 24 nighttime luminescence that is visible from a distance. Effects of construction-related light would be  
 25 greater at the intakes where existing conditions are dark and rural in comparison with the Twin  
 26 Cities Complex, Southern Complex, and Bethany Complex where there are existing sources of light  
 27 that may illuminate suitable habitat. Construction activities could result in dust and the discharge of  
 28 construction-related fluids, which could also affect the species and its habitat if present in or  
 29 adjacent to work areas. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-  
 30 2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement*  
 31 *Spill Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14:

1 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these  
2 potential impacts by (1) training construction staff on protecting the species, reporting  
3 requirements, and the ramifications for not following these measures; (2) implementing spill  
4 prevention and containment plans that would avoid material spills that could affect suitable habitat;  
5 and (3) having a biological monitor present that would ensure that non-disturbance buffers are  
6 intact and all protective measures are being implemented, where applicable.

7 There are no CNDDB (California Department of Fish and Wildlife 2020a) or Delta Habitat  
8 Conservation and Conveyance Program (California Department of Water Resources 2011)  
9 occurrences of California black rail that overlap with permanent or temporary construction areas  
10 for any of the project alternatives. However, there are numerous California black rail occurrences on  
11 mid-channel islands throughout the Delta south of SR 12 (California Department of Fish and Wildlife  
12 2020a; California Department of Water Resources 2011). The tunnel would be constructed under  
13 suitable mid-channel island habitat with recorded occurrences under the central (Alternatives 1, 2a,  
14 2b, and 2c), eastern (Alternatives 3, 4a, 4b, and 4c), and Bethany Reservoir (Alternative 5)  
15 alignments. The use of tunnel boring machines during construction would potentially cause  
16 groundborne vibration in the immediate vicinity of tunnel construction areas. However, because of  
17 the depth at which the tunnel would be constructed, and because the deep soil cover over the tunnel  
18 would effectively dampen and absorb propagated energy from the tunnel crown and the tunnel  
19 floor, no significant noise and vibration effects from the operation of the tunnel boring machine on  
20 California black rail are anticipated (Chapter 24, Section 24.4.3.2).

21 Field investigations would be conducted prior to and during construction under all project  
22 alternatives to more specifically identify appropriate construction methods and design criteria  
23 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
24 existing utilities, and address the establishment of geological and groundwater monitoring  
25 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
26 would involve a variety of ground-disturbing activities that would vary in duration from several  
27 hours to approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
28 Construction Authority 2022a, 2022b) and could result in impacts on habitat and the potential for  
29 injury, mortality, and the disruption of normal behaviors of California black rail. Geotechnical  
30 investigations that would occur in the West Tracy Fault Study area, and over the tunnel alignment  
31 footprints which include test trenches, CPTs, soil borings, and geophysical arrays, would result in  
32 temporary impacts on modeled habitat (Appendix 13C). The Bethany Fault Study investigations  
33 would not affect modeled habitat for California black rail. The following field investigations would  
34 be conducted within proposed surface construction footprints of project facilities (including  
35 portions of tunnel alignments) and would temporarily affect habitat: test trenches, CPTs, soil  
36 borings, ERT, groundwater testing and monitoring, monument installation, pilot studies for  
37 settlement, agronomic testing, and utility potholing. These temporary impacts are not characterized  
38 as an additional loss of habitat because impacts for these locations have already been quantified  
39 within the construction-related footprints but could still result in the potential for injury, mortality,  
40 and disruption of normal behaviors of California black rail, as discussed above for conveyance  
41 facility construction. Environmental Commitments EC-1: Conduct Worker Awareness Training; EC-  
42 2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement*  
43 *Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
44 *Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1)  
45 training construction staff on protecting the species, reporting requirements, and the ramifications  
46 for not following these measures; (2) implementing spill prevention and containment plans that

1 would avoid material spills that could affect suitable habitat; and (3) having a biological monitor  
2 present that would ensure that non-disturbance buffers are intact and all protective measures are  
3 being implemented, where applicable. Noise and visual disturbances from helicopter surveys to  
4 identify buried groundwater and natural gas wells throughout the project area and pile installation  
5 test methods at the north Delta intakes may also cause disturbance to California black rail, as  
6 described above under construction-related effects.

### 7 Operations

8 The operation of project facilities would not require ground disturbance or result in additional  
9 habitat loss, but project operations would generate small levels of noise, have permanent light  
10 sources, and require the periodic presence of staff and vehicle traffic. Noise from the operation of  
11 the water conveyance facilities would not be discernably higher than existing conditions (Chapter  
12 24, Section 24.4.3.2) and the periodic presence of staff and vehicle traffic would not be expected in  
13 the vicinity of suitable black rail habitat. Permanent facility lighting associated with the shafts on  
14 Bouldin Island and Mandeville Island under the central alignment alternatives (Alternatives 1, 2a,  
15 2b, and 2c) and the shaft on Lower Roberts Island under the eastern alignment (Alternatives 3, 4a,  
16 4b, and 4c) and Bethany Reservoir alignment (Alternative 5) could extend into California black rail  
17 habitat; however, as stated in Chapter 3, Section 3.4.12, *Fencing and Lighting*, permanent lighting at  
18 project facilities would be motion activated, downcast, cut-off type fixtures with non-glare finishes,  
19 and therefore permanent facilities would remain dark the majority of the time at night, which would  
20 minimize the potential for this impact.

21 Power for construction and operation of the conveyance facilities has been designed to use existing  
22 power lines and underground conduit to the extent feasible, under all project alternatives. Most new  
23 project lines would be placed on existing poles and towers and therefore would not substantially  
24 alter the existing landscape. New aboveground high-voltage transmission and SCADA lines,  
25 however, would be constructed to power the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b,  
26 and 4c) and Bethany Complex under Alternative 5 (Chapter 3, Figure 3-13 and Figure 3-14).  
27 California black rail are nonmigratory and genetic and isotopic work suggests that although  
28 individuals are capable of long-distance dispersal, movement between California black rail  
29 populations is infrequent (Hall and Beissinger 2017:216). Although there are some patches of  
30 modeled habitat that may support California black rail in the vicinity of the new aboveground high-  
31 voltage lines, California black rail typically perform only very short, low flights (Girard et al.  
32 2010:2410), therefore, it is highly unlikely that this species would experience bird strikes at project  
33 transmission lines. Transmission line poles and towers provide perching substrate for raptors,  
34 which are predators of California black rail. Because of the limited area over which poles would be  
35 installed relative to the amount of California black rail habitat in the Delta, it is assumed that any  
36 increase in predation risk on California black rail from an increase in raptor perching opportunities  
37 would be negligible.

38 Changes in water operations under all project alternatives are not expected to exacerbate  
39 bioaccumulation of methylmercury in California black rail. In general, the highest mercury  
40 methylation rates are associated with high tidal marshes that experience intermittent wetting and  
41 drying and associated anoxic conditions (Alpers et al. 2008:15), which are primary black rail habitat.  
42 Largemouth bass was used as an indicator species for analysis of impacts from changes in  
43 operations from the construction of the water conveyance facilities because bass are good indicators  
44 of mercury contamination throughout the aquatic foodweb (Wood et al. 2010:67). Modeled effects  
45 of mercury concentrations from changes in operations of water conveyance facilities on largemouth



1 bass did not differ substantially from existing conditions (Appendix 9H). Even though black rails do  
2 not consume largemouth bass and do not use aquatic habitats, methylmercury can be transported to  
3 terrestrial foodwebs (Cristol et al. 2008:335), so the lack of substantial change in aquatic foodweb  
4 mercury concentrations indicates that methylmercury transported to tidal marsh foodwebs would  
5 also not increase appreciably; therefore, these results indicate that bioavailability of methylmercury  
6 to black rail would not measurably increase as a result of project operation.

7 Microcystin toxins originate in aquatic systems and can be transported through foodwebs through  
8 consumption (Moy et al. 2016:A). Operation of all project alternatives is not expected to  
9 substantially change the five factors that could create conditions more conducive to CHAB formation  
10 (i.e., temperature, residence time, nutrients, water velocities and associated turbulence and mixing,  
11 and water clarity and associated irradiance) relative to existing conditions upstream of the Delta,  
12 within the Delta, or in Suisun Marsh, Suisun Bay, or San Francisco Bay (Chapter 9). The water quality  
13 modeling results show a potential for increased residence time in some locations and months within  
14 the central Delta, namely Discovery Bay where residence times are already very long, which could  
15 contribute to increased *Microcystis* bloom size in some years at these locations if the remaining four  
16 environmental factors were also at levels conducive to forming CHABs. Nevertheless, based on  
17 known *Microcystis* dynamics in the Delta a small increase of residence time at Discovery Bay would  
18 not cause *Microcystis* blooms to substantially increase in size or last substantially longer, relative to  
19 existing conditions. Because the project alternatives, through their effects on the five factors  
20 potentially associated with CHABs in the Delta, are not expected to cause Delta CHABs to be  
21 substantially larger in size, and because bloom size does not necessarily dictate toxin concentration  
22 in the water, the project alternatives are not expected to substantially increase microcystin or any  
23 other cyanotoxins in the Delta that could cause a substantial adverse impact on California black rail,  
24 relative to existing conditions.

25 Current use and legacy pesticides have the potential to bioaccumulate in the prey items of birds such  
26 as California black rail. Operation of all project alternatives and potential runoff from project  
27 facilities would not result in substantial increases in pesticide concentrations in Delta waters or in  
28 Delta outflows, relative to existing conditions (Chapter 9). Therefore, the project alternatives would  
29 not substantially reduce invertebrate prey populations or increase pesticide exposure to California  
30 black rail. Environmental Commitment EC-14: *Construction Best Management Practices for Biological*  
31 *Resources* (Appendix 3B) would ensure that herbicides used during maintenance activities would be  
32 applied in such a manner as to prevent primary or secondary poisoning of special-status species.

33 Because black rail is an obligate wetland species, it may be at risk of selenium toxicity. Modeled  
34 selenium concentrations in eggs of invertebrate-eating birds, such as black rail, were below the level  
35 of concern, and did not differ substantially from existing conditions under all alternatives (Appendix  
36 9J). Therefore, the project alternatives are not anticipated to substantially increase the risk of  
37 selenium contamination in California black rail.

### 38 Maintenance

39 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
40 in periodic disturbances that could affect California black rail. Maintenance activities include  
41 vegetation management, levee and structure repair, and regrading of roads, which could reduce the  
42 functions of habitat in or adjacent to work areas. If these activities take place during the breeding  
43 season (February 1 through August 31) they could disrupt foraging and nesting behaviors and result  
44 in potential injury and mortality of individuals. Maintenance activities would generally be conducted

1 during the day, except for emergency maintenance, and would therefore not require additional  
2 lighting. Noise effects from maintenance activities could negatively affect California black rail if they  
3 were to nest in the vicinity of water conveyance facilities. Noise from semiannual general and  
4 ground maintenance (e.g., mowing, vegetation trimming, herbicide application) and daily inspection  
5 by vehicle of the shafts on Bouldin Island and Mandeville Island under the central alignment  
6 alternatives (Alternatives 1, 2a, 2b, and 2c) and the shaft on Lower Roberts Island under the eastern  
7 alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and the Bethany Reservoir alternative  
8 (Alternative 5) could cause minor disturbances to California black rail if present in the vicinity these  
9 activities. Levee and access road repair and regrading in the vicinity of occupied habitat would cause  
10 similar disturbances under all project alternatives, but it is highly unlikely that these activities  
11 would result in the direct loss of California black rail habitat.

## 12 ***CEQA Conclusion—All Project Alternatives***

13 Construction, operations, and maintenance of the water conveyance facilities under all project  
14 alternatives would result in impacts on California black rail through the permanent and temporary  
15 loss of modeled habitat, potential injury or mortality, and the potential for disruption of normal  
16 behaviors. For all project alternatives, changes in water operations would not be expected to result  
17 in a measurable increase in mercury or selenium bioavailability or increased pesticide or  
18 microcystins affecting California black rail. The temporary loss of habitat of injury, mortality, and  
19 the disruption of normal behaviors from project construction, operations, and maintenance would  
20 be reduced by Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2:  
21 *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
22 *Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14:  
23 *Construction Best Management Practices for Special-Status Species* (Appendix 3B); however, even  
24 with these commitments, the impacts of the project alternatives on California black rail would be  
25 significant. The implementation of the CMP would be required to offset the loss of habitat (Appendix  
26 3F, Section 3F.3.2.3, *Emergent Wetland, Seasonal Wetlands, Valley/Foothill Riparian, and Other*  
27 *Nontidal Waters*; Appendix 3F, Section 3F.4.3, *Tidal Habitat Mitigation Framework* and Attachment  
28 3F.1, Table 3F.1-3, CMP-17: *California Black Rail Habitat*), which would mitigate the impact  
29 associated with habitat loss to less than significant. Mitigation Measures AES-4b: *Minimize Fugitive*  
30 *Light from Portable Sources Used for Construction*; AES-4c: *Install Visual Barriers along Access Routes,*  
31 *Where Necessary, to Prevent Light Spill from Truck Headlights toward Residences* (Chapter 18); NOI-  
32 1: *Develop and Implement a Noise Control Plan* (Chapter 24); BIO-2b: *Avoid and Minimize Impacts on*  
33 *Biological Resources from Maintenance Activities*; BIO-2c: *Electrical Power Line Support Placement*;  
34 and BIO-32: *Conduct Preconstruction Surveys and Implement Protective Measures to Avoid*  
35 *Disturbance of California Black Rail* would be required to minimize disturbances to habitat and avoid  
36 take, as defined under Section 86 of the California Fish and Game Code. The impacts on California  
37 black rail from the project alternatives would be less than significant with mitigation because the  
38 aforementioned measures would replace lost habitat and reduce direct effects on the species,  
39 including habitat, noise, and visual disturbances, by providing environmental awareness training to  
40 construction personnel, by implementing protective measures during maintenance activities, and  
41 species-specific avoidance measures during construction.

## 42 **Mitigation Measure CMP: Compensatory Mitigation Plan**

43 The CMP (see Impact BIO-1 for a summary discussion of the CMP) would offset the loss of  
44 California black rail habitat (Appendix 3F, Section 3F.3.2.3, *Emergent Wetland, Seasonal*

1 *Wetlands, Valley/Foothill Riparian, and Other Nontidal Waters; Appendix 3F, Section 3F.4.3, Tidal*  
2 *Habitat Mitigation Framework and Attachment 3F.1, Table 3F.1-3, CMP-17: California Black Rail*  
3 *Habitat)* by creating or restoring tidal emergent wetland habitat riparian habitat and managing  
4 these areas in perpetuity.

5 **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for**  
6 **Construction**

7 See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

8 **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary,**  
9 **to Prevent Light Spill from Truck Headlights toward Residences**

10 See description of Mitigation Measure AES-4c under Impact AES-4 in Chapter 18.

11 **Mitigation Measure NOI-1: Develop and Implement a Noise Control Plan**

12 See description of Mitigation Measure NOI-1 under Impact NOI-1 in Chapter 24.

13 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
14 **Resources from Maintenance Activities**

15 See description of Mitigation Measure BIO-2b under Impact BIO-2.

16 **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

17 See description of Mitigation Measure BIO-2c under Impact BIO-2.

18 **Mitigation Measure BIO-32: Conduct Preconstruction Surveys and Implement Protective**  
19 **Measures to Avoid Disturbance of California Black Rail**

20 ***All Project Alternatives***

21 Preconstruction surveys for California black rail will be required by DWR to be conducted 1 year  
22 prior to construction and the year of construction where potentially suitable habitat for this  
23 species occurs within 500 feet of work areas and where access is available. Potentially suitable  
24 habitat includes tidal and nontidal seasonal or perennial wetlands at least 2 acres in size with  
25 any kind of vegetation types consistent with California black rail use in the Delta (as determined  
26 by field evaluations conducted by a CDFW-approved biologist with experience surveying for  
27 black rail) over 10 inches high, whether or not the patch in question was mapped as modeled  
28 habitat. A minimum of four surveys will be conducted between February 1 and April 15, with at  
29 least 10 days between surveys. Because California black rail are most active between 2 hours  
30 before and 3 hours after sunrise, surveys will start at sunrise and continue no later than 9:30  
31 a.m. These surveys will involve the following protocols (based on Evens et al. 1991), or other  
32 CDFW-approved survey methodologies that may be developed using new information and best-  
33 available science and will be conducted by biologists with the qualifications stipulated in the  
34 CDFW-approved methodologies.

- 35 1. Listening stations will be established at 300-foot intervals throughout potential California  
36 black rail habitat that will be affected by construction or CMP restoration activities.  
37 Listening stations will be placed along roads, trails, and levees to avoid trampling wetland

- 1           vegetation. Listening stations will be located a maximum of 10 meters from suitable habitat  
2           where access is available.
- 3           2. Surveys at each station will consist of a biologist listening passively for 1 minute, then  
4           broadcasting prerecorded black rail vocalizations: 1 minute of “grr” calls followed by 0.5  
5           minute of “ki-ki-doo” calls. The CDFW-approved biologist will then listen for another 3.5  
6           minutes for a total of 6 minutes per station. Once a California black rail response is detected,  
7           the biologist will cease broadcasting immediately.
- 8           3. A global positioning system (GPS) receiver and compass will be used to identify survey  
9           stations, angles to call locations, and call locations and distances from listening stations. The  
10          California black rail call type, location, distance from listening station, and time will be  
11          recorded.

12          The project will be implemented in a manner that will not result in take of California black rail  
13          as defined by Section 86 of the California Fish and Game Code. If California black rail is present  
14          in the immediate construction area, the following measures will be required.

- 15          4. To avoid the loss of individual California black rails, activities within 500 feet of potential  
16          habitat will not occur within 2 hours before or after extreme high tides (6.5 feet or above, as  
17          measured at the Golden Gate Bridge), to the extent feasible. During high tide, protective  
18          cover for California black rail is sometimes limited, and disturbance from project activities  
19          could prevent individual rails from reaching available cover.
- 20          5. To avoid the loss of individual California black rails, activities within 500 feet of tidal marsh  
21          areas and managed wetlands will be avoided during the rail breeding season (February 1  
22          through August 31), unless surveys are conducted to determine that no rails are present  
23          within the 500-foot buffer.
- 24          6. If breeding California black rail is determined to be present, activities will not occur within  
25          500 feet of an identified calling center (or a smaller distance if approved by CDFW). If the  
26          intervening distance between the rail calling center and any activity area is greater than 200  
27          feet and across a major slough channel or substantial barrier (e.g., constructed noise  
28          barrier) it may proceed at that location within the breeding season.
- 29          7. If construction activities require removal of potential California black rail habitat, whether  
30          or not rails have been detected there, vegetation will be removed during the nonbreeding  
31          season (September 1 through January 31). Vegetation removal will be completed carefully  
32          using hand tools or vegetation removal equipment that is approved by a CDFW-approved  
33          biologist. The CDFW-approved biologist will search vegetation immediately in front of the  
34          removal tools or equipment and will stop removal if rails are detected. Vegetation removal  
35          will resume when the California black rail leaves the area.
- 36          8. If the construction footprint is within 500 feet of a known calling center, noise reduction  
37          structures such as temporary noise-reducing walls, will be installed at the edge of  
38          construction footprint, as determined by an on-site CDFW-approved biologist. Noise-causing  
39          construction will be initiated during the nonbreeding season (September 1 through January  
40          31), where feasible, so that California black rails can acclimate to noise and activity prior to  
41          nesting.

## 1 ***Mitigation Impacts***

2 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
3 mitigation measure impacts. The analyses below consider the potential impacts associated with  
4 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
5 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
6 *Measures*.

### 7 *Compensatory Mitigation*

8 The creation and enhancement of wetlands as well as habitat for special-status species under the  
9 project's CMP would affect modeled habitat for California black rail (Appendix 13C) from vegetation  
10 removal and grading to create the appropriate topography and soil conditions to establish or restore  
11 habitats on Bouldin Island and the I-5 ponds. Though no specific locations for channel margin  
12 enhancement and tidal wetland habitat creation have been identified, potential areas include the  
13 lower Yolo Bypass and Cache Slough complex. The activities to create these habitat types would  
14 generally include for channel margin enhancement the removal of existing riprap, modification of  
15 the existing channel margin with heavy equipment, and placement of large woody debris on the  
16 channel margin. For tidal restoration, activities would include grading, creation of setback levees,  
17 planting, and breaching of existing levees (Appendix 3F, Section 3F.4.3).

18 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
19 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
20 vernal pool complexes, alkaline seasonal wetlands, or grasslands are located, which do not provide  
21 habitat for California black rail and therefore there would not likely be any effects on the species.  
22 Site-specific analyses are not provided because locations of potential non-bank sites are not  
23 currently known.

24 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
25 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
26 management of agricultural areas but may also include natural communities in the study area  
27 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
28 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
29 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
30 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could support suitable habitat for  
31 California black rail and management activities within occupied habitat could result in the  
32 disruption of normal behaviors, injury, or mortality. Site-specific analyses are not provided because  
33 locations of potential protection instruments are not currently known.

34 The CMP and site-specific permitting approvals would account for any losses of California black rail  
35 habitat from habitat creation by adjusting the overall commitment of tidal emergent wetland  
36 creation or restoration (Appendix 3F, Section 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-  
37 3, CMP-0: *General Design Guidelines*) and therefore mitigate any habitat losses associated with the  
38 CMP to less than significant. The creation and enhancement activities would also have the potential  
39 for injury, mortality, and the disruption of normal behaviors of individuals if restoration activities  
40 occur during the rail breeding season (February 1 through August 31). Environmental Commitments  
41 EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials*  
42 *Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure*  
43 *Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best Management Practices for Special-*  
44 *Status Species* (Appendix 3B) and Mitigation Measure BIO-32: *Conduct Preconstruction Surveys and*

1 *Implement Protective Measures to Avoid Disturbance of California Black Rail* would minimize  
2 disturbances to habitat and to avoid take of California black rail, as defined by Section 86 of the  
3 California Fish and Game Code. These impacts would be less than significant with mitigation because  
4 the aforementioned measures would (1) train construction staff on protecting the species, the  
5 requirements for avoiding impacts, and the ramifications for not following these measures; (2)  
6 minimize dust; (3) implement spill prevention and containment plans that would avoid material  
7 spills that could affect habitat; (4) prior to and during implementing restoration and enhancement  
8 ground disturbance, establish protective buffers around occupied habitat; and (5) have a biological  
9 monitor present that would ensure that non-disturbance buffers are intact and protective measures  
10 are being implemented where applicable.

11 Creation and enhancement of wetlands and tidal habitat restoration under the CMP that would  
12 create California black rail habitat could provide biogeochemical conditions for methylation of  
13 mercury in the newly inundated soils. There is potential for increased exposure of foodwebs to  
14 methylmercury in these areas, with the level of exposure dependent on the amounts of mercury  
15 available in the soils and the biogeochemical conditions. Because Bouldin Island and the I-5 ponds  
16 sites consist of existing managed and agricultural wetlands and ponds, wetland creation and  
17 enhancement are not expected to increase mercury methylation, relative to existing conditions.  
18 Monitoring and adaptive management plans as described in the CMP (Appendix 3F, Section 3F.7.2)  
19 would include mercury monitoring and adaptive management at Bouldin Island and the I-5 ponds to  
20 prevent increased mercury methylation, relative to existing conditions. Mitigation Measure WQ-6:  
21 *Develop and Implement a Mercury Management and Monitoring Plan*, which contains measures to  
22 assess the amount of mercury at tidal restoration sites before project development, followed by  
23 appropriate design, monitoring, and adaptation management, would minimize the potential for  
24 effects of increased methylmercury exposure due to tidal restoration. Therefore, implementation of  
25 the CMP would not be expected to have a significant adverse impact on California black rail.

26 Habitat creation and enhancement under the CMP has the potential to result in conditions that  
27 promote CHABs. Microcystin toxins originate in aquatic systems and can be transported through  
28 foodwebs through consumption (Moy et al. 2016:A) which could result in impacts on California  
29 black rail using created and/or enhanced wetland and tidal marsh habitats with conditions that  
30 promote CHABs. Monitoring and adaptive management plans as described in the CMP (Appendix 3F,  
31 Section 3F.7.2) would include CHAB monitoring and adaptive management at Bouldin Island and the  
32 I-5 ponds to prevent increased CHAB formation, relative to existing conditions. As discussed in  
33 Chapter 9, tidal habitat creation is not expected to cause substantial additional *Microcystis*  
34 production. Therefore, implementation of the CMP would not result in increased CHAB formation  
35 that could cause substantial adverse impacts on California black rail, relative to existing conditions.

36 Wetland creation and enhancement could result in increased exposure of California black rail to  
37 selenium. Modeled selenium concentrations in insect-eating bird eggs were well below the level of  
38 concern, existing selenium concentrations in the Sacramento River watershed are low (Central  
39 Valley Regional Water Quality Control Board 1988:14), and potential selenium exposure to  
40 individuals using these restored sites would be similar to the existing tidal marshes in the Delta,  
41 therefore, restoration activities would not be expected to adversely affect the California black rail  
42 population. Analysis included in Chapter 9 for Impact WQ-10: *Effects on Selenium Resulting from*  
43 *Facility Operations* found that compensatory mitigation would not result in a measurable increase in  
44 selenium concentrations or selenium bioavailability. Furthermore, California black rail populations  
45 are threatened by habitat loss (Evens et al. 1991:963), so increased availability of habitat would  
46 outweigh the potential for low-level increases in selenium exposure. Therefore, potential increased

1 exposure to selenium resulting from restoration would not be expected to have a significant adverse  
2 impact on California black rail populations. The impact on California black rail from the project  
3 alternatives with the CMP would be less than significant with mitigation.

#### 4 Other Mitigation Measures

5 Some mitigation measures would involve ground disturbance, the use of heavy equipment, pile  
6 driving, or pesticides that would have the potential to expose California black rail to excessive noise,  
7 visual disturbance, dust, and hazardous materials that could cause loss of modeled habitat,  
8 disruption of normal behaviors, and injury or mortality. The mitigation measures with potential to  
9 result in impacts on California black rail are similar to those discussed under Impact BIO-31:  
10 *Impacts of the Project on Western Yellow-Billed Cuckoo*. Impacts on California black rail resulting  
11 from mitigation measures would be similar to construction effects of the project alternatives in  
12 certain construction areas and would contribute to California black rail impacts of the project  
13 alternatives.

14 The impacts of habitat loss, noise, visual disturbance, and exposure to dust or hazardous materials  
15 on California black rail would be reduced through the CMP, environmental commitments, and  
16 Mitigation Measure NOI-1: *Develop and Implement a Noise Control Plan* as detailed under Impact  
17 BIO-31: *Impacts of the Project on Western Yellow-Billed Cuckoo*. In addition, Mitigation Measure BIO-  
18 32: *Conduct Preconstruction Surveys and Implement Protective Measures to Avoid Disturbance of*  
19 *California Black Rail* would require species-specific measures to reduce these impacts. Therefore,  
20 impacts on California black rail from implementation of other mitigation measures would be  
21 reduced to less than significant.

22 Overall, the impacts on California black rail from construction of compensatory mitigation and  
23 implementation of other mitigation measures, combined with project alternatives, would not change  
24 the impact conclusion of less than significant with mitigation.

#### 25 **Impact BIO-33: Impacts of the Project on Greater Sandhill Crane and Lesser Sandhill Crane**

26 The methods for the analysis of effects on greater sandhill crane and lesser sandhill crane appear in  
27 Section 13.3.1.1, and information on the life histories and habitat suitability models are presented in  
28 the following species accounts in Appendix 13B: Section 13B.58, *Greater Sandhill Crane*, and Section  
29 13B.59, *Lesser Sandhill Crane*.

#### 30 **All Project Alternatives**

##### 31 Construction

32 The construction of all project alternatives would affect known roost sites and modeled foraging  
33 habitat for greater and lesser sandhill crane. Effects from construction activities would include the  
34 permanent and temporary loss of habitat and potential disturbance of roosting and foraging  
35 behaviors. Sandhill cranes show strong site fidelity to their roost sites and associated foraging  
36 habitat (Ivey et al. 2014a:2); however, there is sufficient habitat in the sandhill crane winter use area  
37 such that the permanent and temporary loss of habitat and potential disturbance of roosting and  
38 foraging behaviors caused by the project is not expected to lead to take of greater sandhill crane, as  
39 defined by Section 86 of the California Fish and Game Code or injury or mortality of lesser sandhill  
40 crane.

1 There would be no permanent or temporary impacts on known permanent roost sites under the  
2 central alignment alternatives (Alternatives 1, 2a, 2b, and 2c). Permanent and temporary impacts on  
3 greater and lesser sandhill crane known temporary roost sites under the central alignment  
4 alternatives (Alternatives 1, 2a, 2b, and 2c) would occur on Bouldin Island from the placement of  
5 RTM site with associated RTM conveyor and handling facilities, from levee and road improvements  
6 along the perimeter of the island, and from geotechnical activities (described further in the  
7 discussion on field investigations).

8 Under the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c), and the Bethany Reservoir  
9 alignment alternative (Alternative 5), there would be no permanent impacts on known permanent  
10 roost sites; however temporary impacts on known permanent roost sites would occur from  
11 geotechnical activities. Permanent and temporary impacts on known temporary roost sites under  
12 the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c), and the Bethany Reservoir  
13 alignment alternative (Alternative 5), would occur from access road construction and work areas for  
14 underground SCADA and power lines on Lower Roberts Island.

15 Greater and lesser sandhill crane modeled foraging habitat would be lost from the construction of  
16 the intakes and the Twin Cities Complex (all alternatives). Under the central alignment alternatives  
17 (Alternatives 1, 2a, 2b, and 2c), the loss of greater and lesser sandhill crane foraging habitat would  
18 result from the construction of shafts located on New Hope Tract, Staten Island, Bouldin Island,  
19 Mandeville Island, and Bacon Island. Staten Island is an important wintering area for sandhill cranes  
20 and regularly hosts a high density of greater and lesser sandhill cranes, particularly early in the  
21 winter season (Ivey et al. 2014b:9). Interested parties provided information that was used to  
22 identify a suitable location for the tunnel shaft on Staten Island (under Alternatives 1, 2a, 2b, and 2c)  
23 in a previously disturbed location adjacent to a road and powerline on the northern portion of the  
24 island (Delta Conveyance Design and Construction Authority 2022d:4).

25 The loss of both greater and lesser sandhill crane foraging habitat under the eastern alignment  
26 alternatives (Alternatives 3, 4a, 4b and 4c) and the Bethany Reservoir alignment alternative  
27 (Alternative 5) would result from the construction of shafts located on New Hope Tract, Canal Tract,  
28 Terminous Tract, King Island, Lower Roberts Island, and Upper Jones Tract (both the eastern  
29 alignment and Bethany Reservoir alignment locations on Upper Jones Tract). Additional impacts on  
30 modeled foraging habitat for the lesser sandhill crane subspecies would result from the construction  
31 of the Southern Complex and associated new SCADA lines (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and  
32 4c; Appendix 13C).

33 In order to avoid disrupting daily flight patterns for sandhill cranes, helicopters would not be used  
34 to string power or SCADA in the project area located north of SR 4 (Delta Conveyance Design and  
35 Construction Authority 2022c).

36 The tunnels for all alternatives would be constructed under known roost sites and modeled foraging  
37 habitat for sandhill cranes. The use of tunnel boring machines during construction would potentially  
38 cause groundborne vibration in the immediate vicinity of tunnel construction areas. However,  
39 because of the depth at which the tunnel would be constructed, and because the deep soil cover over  
40 the tunnel would effectively dampen and absorb propagated energy from the tunnel crown and the  
41 tunnel floor, no significant noise and vibration effects from the operation of the tunnel boring  
42 machine on sandhill cranes are anticipated (Chapter 24, Section 24.4.3.2).

43 Acres of permanent and temporary impacts on modeled roosting and foraging habitat for greater  
44 and lesser sandhill crane are shown in Table 13-70 and Table 13-71, respectively. Environmental



1 Commitment EC-14: *Construction Best Management Practices for Special-Status Species* would ensure  
 2 that temporarily disturbed areas at the Twin Cities Complex, intakes, tunnel shafts, and other  
 3 temporary work areas (both greater and lesser sandhill crane, all alternatives) in addition to the  
 4 Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) for lesser sandhill crane are restored  
 5 (Appendix 3B).

6 **Table 13-70. Impacts on Modeled Habitat for Greater Sandhill Crane by Alternative**

Alternative	Permanent Impacts—Roost (acres) <sup>a</sup>	Permanent Impacts—Temporary Roost (acres) <sup>a</sup>	Permanent Impacts—Foraging (acres) <sup>a</sup>	Temporary Impacts—Permanent Roost (acres)	Temporary Impacts—Roost (acres)	Temporary Impacts—Foraging (acres)	Total (acres)
1	0.00	314.47	1,087.86	0.00	29.42	164.18	1,595.93
2a	0.00	353.34	1,229.83	0.00	31.87	190.01	1,805.05
2b	0.00	237.27	850.58	0.00	32.05	184.77	1,304.67
2c	0.00	282.19	972.79	0.00	32.01	191.59	1,478.58
3	0.00	2.66	1,074.13	1.46	5.79	116.69	1,200.73
4a	0.00	2.66	1,276.94	1.46	5.79	116.53	1,403.38
4b	0.00	2.66	786.63	1.46	5.79	111.21	907.75
4c	0.00	2.66	955.36	1.46	5.79	118.04	1,083.31
5	0.00	3.65	1,339.78	1.46	4.40	78.37	1,427.66

7 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 8 discussion in Section 13.3.1.2.  
 9

10 **Table 13-71. Impacts on Modeled Habitat for Lesser Sandhill Crane by Alternative**

Alternative	Permanent Impacts—Roost (acres) <sup>a</sup>	Permanent Impacts—Temporary Roost (acres) <sup>a</sup>	Permanent Impacts—Foraging (acres) <sup>a</sup>	Temporary Impacts—Permanent Roost (acres)	Temporary Impacts—Roost (acres)	Temporary Impacts—Foraging (acres)	Total (acres)
1	0.00	314.47	1,502.64	0.00	29.42	170.82	1,702.88
2a	0.00	353.34	1,643.66	0.00	31.87	197.80	2,226.67
2b	0.00	237.27	1,263.41	0.00	32.05	191.27	1,724.00
2c	0.00	282.19	1,386.63	0.00	32.01	199.10	1,899.93
3	0.00	2.66	1,530.62	1.46	5.79	127.94	1,668.47
4a	0.00	2.66	1,756.04	1.46	5.79	127.94	1,893.89
4b	0.00	2.66	1,212.64	1.46	5.79	121.59	1,344.14
4c	0.00	2.66	1,399.43	1.46	5.79	129.34	1,538.68
5	0.00	3.65	1,350.21	1.46	4.40	83.99	1,443.71

11 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 12 discussion in Section 13.3.1.2.  
 13

14 Construction activities would not be expected to injure or kill sandhill crane individuals. If a bird is  
 15 present in a region where construction activities are occurring, the bird would be expected to avoid  
 16 the slow-moving or stationary equipment and move to other areas, as they would move away from

1 any other trucks or farm equipment that could be present within or adjacent to agricultural habitats  
2 under existing conditions.

3 Field investigations would be conducted prior and during construction under all project alternatives  
4 to more specifically identify appropriate construction methods and design criteria addressed in the  
5 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
6 and address the establishment of geological and groundwater monitoring programs (Delta  
7 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
8 variety of ground-disturbing activities that would vary in duration from several hours to  
9 approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
10 Construction Authority 2022a, 2022b) and could result in impacts on habitat and the disruption of  
11 normal behaviors of greater and lesser sandhill cranes. Geotechnical investigations associated with  
12 the tunnels for all project alternatives, which include CPTs and soil borings, would result in impacts  
13 on habitat (Appendix 13C). The West Tracy Fault Study and the Bethany Fault Study investigations  
14 would not affect modeled habitat for greater or lesser sandhill cranes. The following field  
15 investigations would be conducted within proposed surface construction footprints of project  
16 facilities (including portions of tunnel alignments) and would temporarily affect habitat: test  
17 trenches, CPTs, soil borings, ERT, groundwater testing and monitoring, monument installation, pilot  
18 studies for settlement, agronomic testing, and utility potholing. These temporary impacts are not  
19 characterized as an additional loss of habitat because impacts for these locations have already been  
20 quantified within the construction-related footprints but could still result in the potential for the  
21 disruption of normal behaviors of sandhill cranes, as discussed above for conveyance facility  
22 construction. Noise and visual disturbances from helicopter surveys to identify buried groundwater  
23 and natural gas wells throughout the project area and pile installation test methods at the north  
24 Delta intakes could affect greater and lesser sandhill cranes if those activities were conducted when  
25 cranes are present in the study area, as described below under *Noise and Visual Disturbances within  
26 Greater and Lesser Sandhill Crane Modeled Habitat*. Environmental Commitments EC-1: *Conduct  
27 Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*;  
28 EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
29 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these  
30 potential impacts by (1) implementing spill prevention and containment plans, (2) implementing  
31 work windows for in-water pile installation test methods, and (3) having a biological monitor  
32 present to implement any additional protective mitigation measures.

### 33 *Noise and Visual Disturbance within Greater and Lesser Sandhill Crane Modeled Habitat*

34 Construction of the water conveyance facilities would require the use of heavy equipment (see Table  
35 24-6 in Chapter 24) over prolonged periods, and would generate noise, require nighttime lighting,  
36 and create visual disturbances. Construction activities conducted during the sandhill crane  
37 wintering season (September 15 through March 15) could cause sandhill cranes roosting or foraging  
38 in the vicinity of work areas to flush, if they perceive such activities as a threat. While sandhill cranes  
39 are known to habituate to a certain degree to increased levels of background noise when the noise  
40 level is relatively constant such as highway traffic (Dwyer and Tanner 1992:29), less is known about  
41 the ability of sandhill cranes to habituate to intermittent noise such as that associated with the  
42 operation of heavy equipment (e.g., pile drivers, construction cranes, compressors, heavy trucks).

43 Hazing techniques are regularly employed in North America to prevent sandhill cranes from causing  
44 significant crop damage or colliding with aircrafts (Barzin and Ballinger 2017:1). Hazing techniques  
45 such as propane cannons and pyrotechnics have been reported to lose their effectiveness as

1 deterrents once individuals are no longer naïve to the auditory disturbance, particularly in high-  
2 value habitat (Barzin and Ballinger 2017:5–6), suggesting that cranes can habituate to extreme and  
3 sporadic sounds. Disturbance from waterfowl hunting can reduce habitat availability to sandhill  
4 cranes (Ivey et al. 2014a:27; Ivey et al. 2014c:16–17) and cranes have been observed to avoid roost  
5 sites once opening day of hunting season has begun (Ivey et al. 2014c:16). Sandhill cranes are  
6 present in the study area during the waterfowl hunting season (approximately October 23 through  
7 January 31), and hunting occurs throughout the study area on Bouldin Island, Little Mandeville  
8 Island, private duck clubs, Stone Lakes NWR within 1 mile of known roost sites, and from public  
9 waterways throughout the Delta. Cranes are therefore exposed to irregular, explosive sound from  
10 shotguns under existing conditions (a 12-gauge shotgun blast is approximately 165 dB) and respond  
11 to those disturbances throughout the winter season.

12 Because the effects of project-related noise and other disturbances on sandhill cranes likely depend  
13 on multiple factors including habitat characteristics and disturbances under existing conditions, and  
14 because the duration and nature of construction activities is relatively novel within the study area, it  
15 is assumed that noise from the construction of water conveyance facilities could temporarily  
16 displace sandhill crane use of habitat in the vicinity of project activities. The potential noise effects  
17 on known roost sites and modeled foraging habitat were analyzed to quantify potential acres of  
18 affected habitat. The methods for the analysis are described in Section 13.3.1.2, *Evaluation of*  
19 *Construction Activities*. In most of the study area, the noise analysis was conducted based on the  
20 assumption that there would be direct line of sight from sandhill crane habitat areas to the  
21 construction site, and, therefore, provides a conservative estimate of effects. However, in many  
22 areas, existing levees would partially or completely block the line of sight and would function as  
23 effective noise barriers, substantially reducing noise transmission. The elevation of the S. P. Cut  
24 levee was incorporated into the sound level contours to develop a more accurate estimate of noise  
25 in the vicinity of the Stone Lakes NWR. Although USFWS uses 60 dBA as a significance threshold for  
26 other special-status bird species (County of San Diego 2021:2.4-3; Ldn Consulting Inc. 2014:13;  
27 California Department of Fish and Wildlife 2013:2), in the absence of data indicating the species-  
28 specific effect that noise levels above baseline would have on sandhill crane, and in the absence of a  
29 quantifiable baseline effect of periodic noise from hunting under existing conditions, noise levels  
30 were assessed above both 60 dBA and 50 dBA. Predicted acres of sandhill crane modeled habitat  
31 affected by increased noise levels from project construction (Tables 13G-1 through Table 13G-8)  
32 and figures depicting the overlay of the sound level contours on modeled foraging and known roosts  
33 sites (Figure 13G-1a through Figure 13G-12b) are shown in Appendix 13G, *Construction Sound Level*  
34 *Impacts on Sandhill Cranes*.

35 *Medium-Term Pile Driving*. Noise levels from pile driving using either impact or vibratory methods  
36 are typically higher than noise levels from heavy construction equipment. The conceptual design  
37 limits the use of impact pile driving at the construction sites where possible. Installation of piles  
38 using vibratory methods produces noticeably lower noise levels than when an impact hammer is  
39 used. Pile driving would be used for several project components including intake cofferdams,  
40 control structures, and bridges. For each component, pile driving would be conducted only during  
41 daytime hours between 7:00 a.m. and 7:00 p.m., and would occur intermittently on a temporary  
42 basis, ceasing once the corresponding phase of construction is complete. Field investigations would  
43 also include minimal pile driving under the pile drive test program.

44 At the north Delta intakes, in-water pile driving required for the construction of cofferdams would  
45 be restricted to occur between June 15 and October 31, and therefore could overlap with up to 1.5  
46 months of the year when cranes are present in the study area (September 15 through March 15). A

1 temporary embankment would be built around the intake work sites prior to pile driving, which  
2 would reduce the noise effects on surrounding habitat. Vibratory pile driving would also be used to  
3 install sheet piles for electrical service buildings at a central location within the river side  
4 embankment of the intake sedimentation basins. It is estimated that these piles would take a total of  
5 about 2 hours of driving time to install at each intake. Foundation piers for the intake structures  
6 would be installed over a period of 18 months. Potential impacts from medium-term pile driving and  
7 heavy construction (combined) are presented in Appendix 13G, Table 13G-1 and Table 13G-2 (all  
8 alternatives), Figure 13G-1a and Figure 13G-1b (Alternative 2a), Figure 13G-5a and Figure 13G-5b  
9 (Alternative 4a), and Figure 13G-9a and Figure 13G-9b (Alternative 5).

10 *Short-Term Pile Driving.* Additional pile driving would be required on a temporary basis for  
11 construction of new bridges for project access roads and rails, and modifications to existing bridges.  
12 The total number of days required for pile installation at bridges would vary between 4 and 45 days  
13 (Chapter 24, Appendix 24F, *Pile Driving Specifications for New Bridges on Haul Routes*). Some impact  
14 driving may be required for installing permanent bridge supports, though vibratory and cast-in-  
15 drilled-hole techniques would be used wherever possible. Bridge construction or reconstruction  
16 within the vicinity of greater and lesser sandhill crane habitat would occur at the Hood-Franklin  
17 bridge over Snodgrass Slough (all alternatives, Appendix 13G, Figure 13G-4a, Figure 13G-8a, and  
18 Figure 13G-12a), over a drainage canal for Intake A (Alternatives 2a [Appendix 13G, Figure 13G-4a]  
19 and 4a [Appendix 13G, Figure 13G-8a] only), the SR 12 bridge over Little Potato Slough, the SR 12  
20 bridge over West Terminous Drive, and a new bridge over SR 12 to access Bouldin Island  
21 (Alternatives 1, 2a, 2b, and 2c; Appendix 13G, Figure 13G-4a), a new bridge overpass in Holt over  
22 the BNSF tracks and EBMUD Mokelumne Aqueducts (Alternatives 1, 2a, 2b, and 2c; Appendix 13G,  
23 Figure 13G-4b), a new bridge between Mandeville and Bacon Island over Connection Sough  
24 (Alternatives 1, 2a, 2b, and 2c; Appendix 13G, Figure 13G-4b), and several new bridges for access to  
25 Lower Roberts Island including one at Burns Cutoff for the Lower Robert's Rail Spur Connection  
26 (Alternatives 3, 4a, 4b, 4c, and 5; Appendix 13G, Figure 13G-8b). In-water pile driving at these  
27 bridges would also occur between June 15 and October 31, and therefore could overlap with up to  
28 1.5 months of the year when cranes are present in the study area (September 15 through March 15).  
29 Construction of the emergency spillway and outlet structure of the Southern Forebay and the  
30 California Aqueduct Control Structure (Alternative 2a and Alternative 4a) and the Bethany  
31 Reservoir Discharge Structure (Alternative 5) would require the installation of sheet piles using  
32 vibratory methods but this would not affect habitat for greater sandhill crane or lesser sandhill  
33 crane (Appendix 13G, Figures 13G-4b, 13G-8b, and 13G-12b). Potential acres of impact from short-  
34 term pile driving are presented in Appendix 13G, Table 13G-7 and Table 13G-8. Specifications of pile  
35 driving for new bridges and bridge widenings to accommodate new access roads are provided in  
36 Appendix 24F.

37 *Heavy Construction.* Standard heavy equipment would be used to construct the intake components  
38 over an estimated 12 years (all alternatives, Appendix 13G, Tables 13G-3 and 13G-4; Figures 13G-2a,  
39 13G-6a, and 13G-10a). Construction of the Twin Cities Complex (all alternatives; Appendix 13G,  
40 Figures 13G-2a, 13G-6a, and 13G-10a), New Hope Tract Maintenance Shaft, Staten Island  
41 Maintenance Shaft, Bouldin Island Launch/Reception Shaft, Mandeville Island Maintenance Shaft,  
42 and Bacon Island Reception Shaft (Alternatives 1, 2a, 2b, and 2c; Appendix 13G, Figures 13G-2a and  
43 13G-2b), New Hope Tract Maintenance Shaft, Canal Ranch Tract Maintenance Shaft, Terminous  
44 Tract Reception Shaft, King Island Maintenance Shaft, Lower Roberts Island Launch/Reception  
45 Shaft, and Upper Jones Tract Maintenance Shaft (Alternatives 3, 4a, 4b, 4c, and 5; Appendix 13G,  
46 Figures 13G-6a, 13G-6b, 13G-10a, 13G-10b) would also occur within or adjacent to greater and

1 lesser sandhill crane habitat and would occur over 12-year period. Work at these shaft locations  
2 would be conducted during daytime hours (7:00 a.m. to 7:00 p.m.) with the exception of 24-hour  
3 tremie concrete pours described above that would need to occur continuously for up to 1 month  
4 duration depending on the site (up to 1 month for each intake, accounting for nonconsecutive pours,  
5 and up to 1 week for each shaft site, accounting for nonconsecutive pours). The sound level contours  
6 for long-term construction include the modeled noise from the haul trucks that would travel along  
7 the intake haul road along the western toe of the abandoned railroad embankment adjacent to Stone  
8 Lakes NWR (all alternatives; Appendix 13G, Figures 13G-2a, 13G-6a, 13G-10a).

9 *Linear Construction Features.* Construction of roads, utilities, and associated work areas under all  
10 alternatives would occur for approximately one week in duration at a given location (Appendix 13G,  
11 Table 13G-5 and Table 13G-6 [all alternatives] and Figures 13G-3a, 13G-3b [Alternative 2a], Figures  
12 13G-7a and 13G-7b [Alternative 4a], and Figures 13G-11a and 13G-11b [Alternative 5]). Helicopters  
13 would not be used to install conductor line within greater sandhill crane foraging habitat. However,  
14 helicopters would be used to install a conductor line near the Southern Complex, which could  
15 overlap with suitable lesser sandhill crane foraging habitat. It would generally take less than 15  
16 minutes to string conductor line along each structure, and generally helicopters would not be within  
17 any given line mile for more than 3 hours, however the use of helicopters during the winter crane  
18 use season (September 15 through March 15) in occupied lesser sandhill crane habitat could affect  
19 lesser sandhill crane use of the sites during construction.

20 Evening and nighttime construction activities would require the use of bright lights. All lights used  
21 during nighttime construction would be downcast, cut-off type fixtures with non-glare finishes,  
22 natural light qualities, and minimum intensity. Construction-related lighting would be shielded and  
23 oriented in such a manner so as not to subject the immediate surroundings to extremes in the levels  
24 of light, however, these types of light generate an ambient nighttime luminescence that is visible  
25 from a distance. Effects of construction-related light would be greater at the intakes where existing  
26 conditions are dark and rural in comparison with the Twin Cities Complex where there are existing  
27 sources of light that may illuminate suitable habitat. Nighttime construction could also result in  
28 headlights flashing into roost sites when construction vehicles are turning onto or off construction  
29 access routes. Direct light from automobile headlights has been observed to cause roosting cranes to  
30 flush and it is thought that they may avoid roosting in areas where lighting is bright. However,  
31 cranes exhibit high roost site fidelity (Ivey et al. 2014a:2) and, in some cases, may still use artificially  
32 lit sites due to this loyalty.

33 DWR has designed the project to minimize lighting and visual effects from traffic to reduce  
34 disturbance to sandhill cranes in the vicinity of Stone Lakes NWR. Project-related traffic on Hood-  
35 Franklin Road would be limited to shuttles bringing construction employees to and from the intake  
36 construction areas and the park and ride lot. For approximately 3 weeks, concrete pours would  
37 occur for 24 hours per day at the intakes and tunnel shafts and nighttime truck traffic would be  
38 required to transport concrete during this period. All construction truck traffic to serve the intake  
39 locations would occur along Lambert Road and a new intake haul road which would be constructed  
40 at ground level along the western toe of the abandoned railroad embankment. The abandoned  
41 railroad embankment rises approximately 20 feet above ground level and would serve to reduce  
42 light from nighttime truck traffic extending into roosting and foraging habitat within the Stone Lakes  
43 NWR. As described in Environmental Commitment EC-8: *On-Road Haul Trucks*, DWR would consider  
44 the use of electric or hybrid-electric vehicles over diesel counterparts to the extent that they become  
45 commercially available, earn a track record for reliability in real-world construction conditions, and  
46 become cost effective.

1 RTM movement, drying, and testing from the tunnel launch shaft sites would occur 20 hours per day  
2 Monday through Friday and 10 hours on Saturdays. This would involve RTM being removed from  
3 the tunnel through the launch shafts and transported by conveyor, truck, or rail to handling and  
4 storage facilities near launch shaft sites. Therefore, the use of bright lights may be needed to  
5 illuminate loading and offloading areas, which could affect crane use of adjacent habitat or roosting  
6 behavior.

7 The general presence and movement of humans, vehicles, and other equipment could disturb  
8 sandhill cranes within the vicinity of work areas. Some studies have shown that, while sandhill  
9 cranes do show a response to low levels of human presence (Wilkins et al. 2017:263), it does not  
10 appear to be a substantial response in many cases (Eldred 2009:35), and some degree of habituation  
11 does occur over time. The increase in project-related human presence and visual disturbance would  
12 be correlated with the intensity of construction activity in the work area, and along roadways where  
13 construction-related traffic would occur. Increased noise and lighting are directly linked to these  
14 activities and therefore it is not possible to clearly distinguish between additional disturbance  
15 effects from increased human presence and visual disturbance and other construction-related noise  
16 and lighting effects.

### 17 Operations

18 The operation of project facilities would not require ground disturbance or result in additional  
19 habitat loss, but project operations would generate small levels of noise, have permanent light  
20 sources, and require the periodic presence of staff and vehicle traffic. Noise from the operation of  
21 the water conveyance facilities would not be discernably higher than existing conditions. Periodic  
22 vehicle traffic would not be expected to be greater than similar disturbance under existing  
23 conditions within sandhill crane habitat (e.g., recreational vehicles, farm equipment). Permanent  
24 lighting at project facilities under all project alternatives could extend into suitable habitat for  
25 greater and lesser sandhill cranes; however, as stated in Chapter 3, Section 3.4.12, *Fencing and*  
26 *Lighting*, permanent lighting at project facilities would be motion activated, downcast, cut-off type  
27 fixtures with non-glare finishes, which would minimize the potential for this impact.

28 Changes in water operations under all project alternatives would not exacerbate bioaccumulation of  
29 methylmercury in greater sandhill crane and lesser sandhill crane. Largemouth bass was used as an  
30 indicator species for analysis of impacts from changes in operations from the construction of the  
31 water conveyance facilities because they are good indicators of mercury contamination throughout  
32 the aquatic foodweb (Wood et al. 2010:67; Appendix 9H). Although the magnitude of  
33 methylmercury bioaccumulation differs among species and foodwebs, methylmercury can be  
34 transported to terrestrial foodwebs through consumption of aquatic prey (Cristol et al. 2008:335),  
35 therefore changes in aquatic foodweb methylmercury concentrations are assumed to result in  
36 changes in adjacent terrestrial foodwebs. Results of the quantitative modeling of mercury effects on  
37 largemouth bass as a surrogate species likely overestimate the effects on greater sandhill crane and  
38 lesser sandhill crane because of their position in the foodweb. The modeled effects of mercury  
39 concentrations from changes in water operations on largemouth bass did not differ substantially  
40 from existing conditions; therefore, results also indicate greater sandhill crane and lesser sandhill  
41 crane tissue concentrations would not measurably increase as a result of project operations.

42 Current use and legacy pesticides would not be expected to bioaccumulate in the food items of  
43 sandhill cranes. Operation of all project alternatives and potential runoff from project facilities  
44 would not result in substantial increases in pesticide concentrations in Delta waters or in Delta

1 outflows and would not result in land-use changes that would increase use of pesticides, relative to  
2 existing conditions. Therefore, the project alternatives would not substantially reduce invertebrate  
3 prey populations or increase pesticide exposure to sandhill cranes. Environmental Commitment EC-  
4 14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would ensure  
5 that herbicides used during maintenance activities would be applied in such a manner as to prevent  
6 primary or secondary poisoning of special-status species.

7 Microcystin toxins originate in aquatic systems and can be transported through foodwebs through  
8 consumption (Moy et al. 2016:A) and can affect greater sandhill and lesser sandhill crane if they  
9 forage near aquatic habitats with conditions that promote formation of CHABs. Operation of all  
10 project alternatives is not expected to substantially change the five factors that could create  
11 conditions more conducive to CHAB formation (i.e., temperature, residence time, nutrients, water  
12 velocities and associated turbulence and mixing, and water clarity and associated irradiance)  
13 relative to existing conditions within the Delta (Chapter 9, *Water Quality*). The water quality  
14 modeling results show a potential for increased residence time in some locations and months within  
15 the central Delta, namely Discovery Bay where residence times are already very long, which could  
16 contribute to increased *Microcystis* bloom size in some years at these locations if the remaining four  
17 environmental factors were also at levels conducive to forming CHABs. Nevertheless, based on  
18 known *Microcystis* dynamics in the Delta a small increase of residence time at Discovery Bay would  
19 not cause *Microcystis* blooms to substantially increase in size or last substantially longer, relative to  
20 existing conditions. Because the project alternatives, through their effects on the five factors  
21 potentially associated with CHABs in the Delta, are not expected to cause Delta CHABs to be  
22 substantially larger in size, and because bloom size does not necessarily dictate toxin concentration  
23 in the water, the project alternatives are not expected to substantially increase microcystin or any  
24 other cyanotoxins in the Delta that could cause a substantial adverse impact on greater sandhill  
25 crane or lesser sandhill crane, relative to existing conditions.

26 Changes in selenium concentrations were analyzed in Chapter 9, and it was determined that, relative  
27 to existing conditions, water conveyance facilities would not result in substantial, long-term  
28 increases in selenium concentrations in water in the Delta under any alternative. Modeled selenium  
29 concentrations in eggs of invertebrate-eating birds, were below the level of concern and did not  
30 differ substantially from existing conditions under all alternatives (Appendix 9J). Therefore, the  
31 project alternatives are not anticipated to substantially increase the risk of selenium contamination  
32 in greater sandhill crane or lesser sandhill crane.

33 Sandhill cranes are known to be susceptible to collision with aboveground wires (Bevanger  
34 1998:68; Wright et al. 2009:2; Murphy et al. 2016a:480; Hays et al. 2021:1440; Dwyer et al. 2019:1).  
35 Sandhill cranes fly frequently between roost and foraging areas during the day, after which they  
36 settle down at traditional roost sites for the night. Because most greater sandhill crane movement in  
37 the Delta occurs within approximately 1.2 miles from their primary roost sites (Ivey et al.  
38 2015:523), the proximity of aboveground lines to known roost sites is a key issue in evaluating  
39 collision risk (Morkill and Anderson 1990:8; Hays et al. 2021:1445). Delta wintering cranes are also  
40 regularly exposed to dense fog, which limits visibility and increases mortality risk from collision  
41 with power lines. While overall movement may decrease during foggy conditions, greater sandhill  
42 cranes are known to fly in the fog, increasing their susceptibility to collision with overhead wires. In  
43 addition, this species flies in flocks moving several times a day between feeding and roosting areas.  
44 Flocking behavior increases collision risk compared to non-flocking species because of decreased  
45 visibility for birds flying at the rear of the flock (Murphy et al. 2009:18; Jenkins et al. 2010:10; Avian  
46 Power Line Interaction Committee 2012:37; Murphy et al. 2016b:315). Lastly, the crane's large body

1 size, with high wing loading/low aspect ratio, limits maneuverability, making cranes vulnerable to  
2 collision relative to more agile species (Avian Power Line Interaction Committee 2012:37). In  
3 addition to collision as a result of daytime travel between roosts and foraging areas, cranes may  
4 experience nighttime mortality when flushed from their roosts (e.g., by coyotes), further  
5 contributing to an increased risk of collision when power lines are located near roost sites.  
6 Migration flight could cause limited risks for cranes. Cranes arrive in the Delta region beginning in  
7 September, where they reside until late February to early March, when they begin their northward  
8 migration back to the breeding grounds. Migration flights usually begin after mid-morning, when  
9 thermals develop, and finish before or just after sunset. During migration, birds fly at altitudes of up  
10 to 4,600 meters, with most flights between 150 and 760 meters (Gerber et al. 2020), far above the  
11 height of proposed power lines. Cranes are exposed to collision risk during takeoff and landing  
12 associated with migration.

13 The project has been designed to avoid death or injury of greater sandhill crane (or any other  
14 actions defined as “take” as defined by Section 86 of the California Fish and Game Code). To the  
15 maximum extent feasible, existing power lines and underground conduit would be used under all  
16 project alternatives. In order to avoid impacts on habitat, the project would not install new overhead  
17 power lines or SCADA routes in sensitive areas for greater sandhill crane. Additionally, due to these  
18 same concerns, helicopters would not be used to string power or SCADA in the project area located  
19 north of SR 4 (Delta Conveyance Design and Construction Authority 2022c:4).

20 Most greater sandhill crane movement in the Delta occurs within approximately 1.2 miles of their  
21 primary roost sites (Ivey et al. 2015:523) and Brown et al. (1987:131) found that no sandhill crane  
22 collisions occurred where distances from power lines to bird-use areas were greater than or equal  
23 to 1 mile (Avian Power Line Interaction Committee 2012:50). All proposed new aboveground  
24 towers and associated SCADA and transmission lines would be located at least 3 miles or more from  
25 the nearest known greater sandhill crane roost site under all alternatives. New aboveground lines  
26 north of SR 4 would be limited to one overhead 20-meter transmission line along SR 12 that would  
27 be required to connect a new substation to the existing overhead transmission lines to provide  
28 service to Bouldin Island under the central alignment alternatives (Alternatives 1, 2a, 2b, and 2c;  
29 Chapter 3, Figure 3-13) and one overhead 20-meter transmission line on Lower Roberts Island that  
30 would be required to connect a new substation to the existing overhead transmission lines under  
31 the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and the Bethany Reservoir  
32 alignment (Alternative 5). These short segments of aboveground lines are at least 3 miles from the  
33 nearest known greater sandhill crane roost site (Appendix 13B, Section 13B.58, Figure 13B.58-1),  
34 greater than twice the average foraging distance of greater sandhill cranes (Ivey et al. 2015:523).  
35 Lesser sandhill cranes travel further distances and have larger home-range sizes than greater  
36 sandhill cranes (Ivey et al. 2015:525). These short segments of new project lines are also at least 3  
37 miles from the nearest known lesser sandhill crane roost site (Appendix 13B, Section 13B.59, Figure  
38 13B.59-1), which is the average distance of lesser sandhill crane movement from their primary roost  
39 sites in the Delta (Ivey et al. 2015:523). New aboveground high-voltage transmission and SCADA  
40 lines that would be constructed to serve the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b,  
41 and 4c; see Chapter 3, Figure 3-13 and Figure 3-14) between Brentwood and Discovery Bay are also  
42 greater than 3 miles from the nearest known greater or lesser sandhill crane roost site and therefore  
43 similarly avoid the area within the average foraging distance for either sandhill crane subspecies.

44 Under all project alternatives, aboveground SCADA lines would be placed on existing poles or  
45 towers from Franklin Boulevard to Freeport Boulevard and from the Sacramento River to Scribner  
46 Road just east of Clarksburg. Replacement aboveground transmission lines on existing poles would



1 be needed from the Franklin Substation, along Franklin Boulevard to Lambert Road. From the  
2 intersection of Lambert Road and Franklin Boulevard, these transmission lines would be extended  
3 underground to the Lambert batch plant, the intakes, and the Twin Cities Complex (Chapter 3,  
4 Figure 3-13 and Figure 3-14). Replacement aboveground transmission lines along Franklin Road  
5 would be placed at the same vertical height as the existing lines on the opposite side of the tower.  
6 Replacement aboveground transmission and SCADA lines located within 1.2 miles of known roost  
7 sites, in the absence of mitigation, could increase the potential for collision for greater sandhill  
8 cranes (within 3 miles of known roost sites for lesser sandhill cranes; Ivey et al. 2015:523) if they  
9 were not constructed within the same vertical prism as the existing lines. This potential for collision,  
10 in the absence of mitigation, could also be exacerbated by construction-related effects (e.g., flushing  
11 caused by noise disturbance), especially in low-visibility conditions.

### 12 Maintenance

13 The maintenance of aboveground water conveyance facilities for all project alternatives would  
14 result in periodic disturbances that could affect roosting and foraging sandhill cranes. Maintenance  
15 activities across all facilities that could affect sandhill cranes (all project alternatives) include  
16 repaving of access roads every 15 years, semiannual general and ground maintenance (e.g., mowing,  
17 vegetation trimming, herbicide application), and daily or weekly inspections by vehicle. Noise and  
18 visual disturbances from these maintenance activities at the intakes and shaft sites could disturb  
19 greater and sandhill cranes roosting or foraging in the vicinity of work areas if activities are  
20 conducted between October and mid-March (when cranes are present in the study area). However,  
21 as described above under construction-related effects, there is insufficient data to assess the effects  
22 that of maintenance noise levels would have on sandhill crane behavior, relative to existing  
23 conditions. Maintenance activities would generally be conducted during the day, except for  
24 emergency maintenance, and would therefore not require additional lighting.

### 25 **CEQA Conclusion—All Project Alternatives**

26 Construction, operations, and maintenance of the water conveyance facilities under all project  
27 alternatives could result in impacts on greater sandhill crane and lesser sandhill crane through the  
28 permanent and temporary loss of known roost sites and modeled foraging habitat and the potential  
29 disruption of normal behaviors. The temporary loss of habitat and potential impacts of the  
30 disruption of normal behaviors from project construction would be reduced by Environmental  
31 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
32 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
33 *Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best Management*  
34 *Practices for Biological Resources* (Appendix 3B); however, even with these commitments, the loss of  
35 habitat from the construction of the project alternatives, and the potential for the disruption of  
36 normal behaviors from construction, operations, and maintenance activities on greater sandhill  
37 crane and lesser sandhill crane would be significant. The implementation of the CMP would be  
38 required to offset the loss of roosting and foraging habitat by creating roosting and foraging habitat  
39 and protecting agricultural foraging habitat for sandhill cranes (Appendix 3F, Attachment 3F.1,  
40 Table 3F1-3, CMP-18a: *Sandhill Crane Roosting Habitat*, and CMP-18b: *Sandhill Crane Foraging*  
41 *Habitat*), which would reduce the impact associated with habitat loss to less than significant.  
42 Because the greater sandhill crane is listed as “fully protected” under the California Fish and Game  
43 Code Section 3511, activities that would result in “take” as defined by Section 86 of the Fish and  
44 Game Code (i.e., “to hunt, pursue, catch, capture, or kill, or attempt to” undertake these activities) are

1 prohibited. The project alternatives have been designed to avoid any activities that would result in  
2 actions considered “take” of greater sandhill crane. The project alternatives would use existing  
3 power lines or underground conduit to the extent possible for the purpose of avoiding potential  
4 injury or direct mortality of the greater sandhill crane and all new aboveground lines would be  
5 located outside of the roost sites or foraging habitat for greater sandhill crane. Mitigation Measure  
6 BIO-2c: *Electrical Power Line Support Placement*, which requires that project lines installed on  
7 existing poles or towers be placed in the same vertical prism as existing lines where feasible, and  
8 that all project lines within 3 miles of greater sandhill crane roost sites be fitted with bird flight  
9 diverters that are visible under all conditions and based on APLIC or more current guidance (Avian  
10 Power Line Interaction Committee 2006, 2012), would minimize any additional potential collisions  
11 of greater or lesser sandhill cranes from project alternatives. Mitigation Measures NOI-1: *Develop  
12 and Implement a Noise Control Plan* (Chapter 24); BIO-2b: *Avoid and Minimize Impacts on Biological  
13 Resources from Maintenance Activities*; AES-4b: *Minimize Fugitive Light from Portable Sources Used  
14 for Construction*; AES-4c: *Install Visual Barriers along Access Routes, Where Necessary, to Prevent  
15 Light Spill from Truck Headlights toward Residences* (Chapter 18); and BIO-33: *Avoid and Minimize  
16 Disturbance of Sandhill Cranes* would mitigate the impacts on greater sandhill crane and lesser  
17 sandhill crane to a less-than-significant level. Therefore, the impacts on greater sandhill crane and  
18 lesser sandhill crane from the project alternatives would be less than significant with mitigation  
19 because these measures would compensate for lost habitat and reduce direct effects on these  
20 species by implementing protective measures during maintenance activities, which would include  
21 assessing work areas for habitat and conducting surveys where appropriate and delaying  
22 maintenance activities (either by season or time of day) where feasible; by designing lighting that  
23 avoids spillover into habitat; by reducing noise impacts through the implementation of time of day  
24 restrictions on construction and noise attenuating measures where feasible; and by avoiding and  
25 minimizing disturbance of roosting and foraging cranes by conducting surveys, conducting work  
26 outside of the winter crane season (September 15 through March 15) to the extent feasible when  
27 they are present in the study area, and by establishing roosting and foraging habitat to compensate  
28 for disturbance and displacement of sandhill cranes during construction.

### 29 **Mitigation Measure CMP: Compensatory Mitigation Plan**

30 The CMP (see Impact BIO-1 for a summary discussion of the CMP) would offset the loss of  
31 greater sandhill crane and lesser sandhill crane roosting habitat by creating roosting habitat on  
32 Bouldin Island or in suitable lands that provide connectivity between Stone Lakes NWR and  
33 Cosumnes River Preserve, and managing these areas in perpetuity (Appendix 3F, Attachment  
34 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting Habitat*). The CMP would also offset the  
35 loss of greater and lesser sandhill crane foraging habitat by protecting high- to very high-value  
36 foraging habitat for greater sandhill crane, with at least 80% maintained in very high-value  
37 types (corn and rice) in any given year. This foraging habitat would be within 2 miles of known  
38 roost sites for both subspecies and would be managed in perpetuity (Appendix 3F, Attachment  
39 3F.1, Table 3F.1-3, CMP-18b: *Sandhill Crane Foraging Habitat*). Foraging habitat protected for  
40 Swainson’s hawk (Appendix 3F, Attachment 3F.1, Table 3F.1-3, CMP-19b: *Swainson’s Hawk  
41 Foraging Habitat*) would also benefit lesser sandhill crane.

### 42 **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for 43 Construction**

44 See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

1           **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary,**  
2           **to Prevent Light Spill from Truck Headlights toward Residences**

3           See description of Mitigation Measure AES-4c under Impact AES-4 in Chapter 18.

4           **Mitigation Measure NOI-1: Develop and Implement a Noise Control Plan**

5           See description of Mitigation Measure NOI-1 under Impact NOI-1 in Chapter 24.

6           **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
7           **Resources from Maintenance Activities**

8           See description of Mitigation Measure BIO-2b under Impact BIO-2.

9           **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

10          See description of Mitigation Measure BIO-2c under Impact BIO-2.

11          **Mitigation Measure BIO-33: Avoid and Minimize Disturbance of Sandhill Cranes**

12          ***All Project Alternatives***

13          Construction will be avoided during the sandhill crane wintering season (September 15 through  
14          March 15) to the extent feasible. In addition, the following measures will be implemented to  
15          avoid and minimize impacts on greater and lesser sandhill crane and to avoid take of greater  
16          sandhill crane as defined by Section 86 of the California Fish and Game Code.

17          1. Preconstruction Surveys

- 18           a. Preconstruction surveys will be conducted to evaluate the use of sandhill crane modeled  
19           habitat by a qualified biologist familiar with sandhill crane biology and experienced with  
20           sandhill crane survey techniques. Preconstruction surveys will be conducted for sandhill  
21           crane temporary (cultivated lands) and permanent (managed wetlands) roost sites  
22           (Ivey et al. 2014a:6) within 0.75 mile of the construction area boundary where access is  
23           available. Surveys will be conducted during the winter prior to project implementation,  
24           over multiple days within the survey area by a qualified biologist with experience  
25           observing the species. DWR will coordinate with CDFW and Refuge biologists prior to  
26           conducting sandhill crane preconstruction surveys.
- 27           b. Prior to construction, a noise expert will create a sound level contour map showing the  
28           50 dBA sound level contour specific to the type and location of construction to occur in  
29           the area and existing noise barriers such as levees or embankments. The sandhill crane  
30           survey data will be used with GIS-based methods to evaluate habitat loss, the acres of  
31           habitat affected by the 50 dB sound level contour, to identify lands in fulfillment of  
32           minimization requirements, and to determine the total affected and compensatory  
33           habitat required, at the time of project footprint finalization. The sandhill crane foraging  
34           habitat model may be updated using agricultural land-use data or a combination of land-  
35           use and survey data to allow for avoidance and minimization requirements to be  
36           quantified using up-to-date information.

37          2. Timing

- 1 a. Construction of some project facilities such as access roads and underground  
2 transmission lines may be scheduled so that they occur outside of the crane wintering  
3 season (September 15 through March 15). The construction activities with a high  
4 potential to disturb cranes, such as pile driving, that need to occur for only limited time  
5 periods will be scheduled for periods outside the sandhill crane wintering season  
6 (September 15 through March 15) to the extent feasible.
- 7 b. Helicopter surveys to identify buried groundwater and natural gas wells throughout the  
8 project area and pile installation test methods at the north Delta intakes will be  
9 conducted outside of the sandhill crane wintering season (September 15 through March  
10 15). Pile installation test methods will include noise monitoring to test the site-specific  
11 effectiveness of noise minimization measures (e.g., shrouds around the hammer as  
12 described below), to determine which measures will be feasible and effective to  
13 implement during pile installation.
- 14 c. Other field investigations including test trenches, CPTs, soil borings, ERT, groundwater  
15 testing, monument installation, pilot studies for settlement, agronomic testing, and  
16 utility potholing will not be conducted within known permanent and temporary roost  
17 sites during the sandhill crane wintering season (September 15 through March 15).
- 18 d. To the extent feasible, construction within habitat that is known to be occupied based on  
19 preconstruction surveys and cannot be completed prior to commencement of the  
20 wintering season, will be started at a minimum, 14 days before September 15 or 14 days  
21 after March 15, such that no new sources of noise or other major disturbance that could  
22 affect sandhill cranes will be introduced after the sandhill cranes arrive at their  
23 wintering grounds.

24 3. Minimize Effects on Sandhill Crane Foraging and Roosting Habitat Resulting from Water  
25 Conveyance Facilities Construction

26 DWR will implement the following measures to minimize effects on sandhill crane resulting  
27 from implementation of the final design of the water conveyance facilities.

28 a. Foraging Habitat

- 29 i. The final design of the conveyance facilities will avoid construction-related loss of  
30 sandhill crane foraging habitat to the extent feasible.
- 31 ii. Avoid pile driving and general construction-related combined noise effects on  
32 foraging habitat to the extent feasible. DWR will avoid the area of crane foraging  
33 habitat to be affected during the day (from 1 hour after sunrise to 1 hour before  
34 sunset) by construction noise exceeding 50 dBA  $L_{eq}$  (1 hour), where feasible.<sup>1</sup>  
35 Prior to construction, a noise expert will create a sound level contour map  
36 showing the 50 dBA sound level contour specific to the type and location of  
37 construction to occur in the area and existing noise barriers such as levees or  
38 embankments. DWR will use shrouds or noise blankets to reduce noise from  
39 impact hammers or vibratory pile drivers at the intake work sites, which have  
40 been shown to reduce pile hammer noise by 8 to 23 dBA (Teachout and Cushman  
41 2005:8; Washington State Department of Transportation 2018:7.15). Artificial  
42 noise barriers may be installed to decrease noise levels at foraging habitat below

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<sup>1</sup> 50 decibels averaged over a 1-hour period.

1 50 dBA  $L_{eq}$  (1 hour). However, the visual effects of noise barriers on sandhill  
2 cranes are unknown; therefore, all other options to reduce noise (e.g., installation  
3 of shrouds at pile driving locations at the intakes and other construction sites) will  
4 be implemented before installing noise barriers in close proximity to crane  
5 habitat. As described above, test piles constructed under field investigations and  
6 sound level surveys will determine site-specific considerations and feasibility for  
7 implementation of these measures.

- 8 iii. Enhance foraging habitat to avoid loss of foraging values that could otherwise  
9 result from unavoidable noise-related effects. DWR will enhance 0.1 acre of  
10 foraging habitat for each acre of foraging habitat to be indirectly affected within  
11 the 50 dBA  $L_{eq}$  (1 hour) construction sound level contour during the wintering  
12 season (September 1 through March 15). The enhanced foraging habitat will be  
13 established one crane wintering season (September 1 through March 15) prior to  
14 construction and will be maintained until the activities causing the indirect noise  
15 effect is completed. The enhanced habitat will consist of corn fields that will not  
16 be harvested and will be managed to maximize food availability to sandhill cranes  
17 (e.g., corn stalks will be knocked down or mulched to make grain available to  
18 foraging cranes). A management plan for the enhanced habitat will be completed  
19 prior to establishing the habitat, in coordination with a qualified biologist with  
20 experience managing sandhill crane habitat on cultivated lands, or experience  
21 directing such management. The enhanced habitat will be located outside the  
22 construction-related 50 dBA  $L_{eq}$  (1 hour) sound level contour and within 1 mile of  
23 the affected habitat.

24 b. Roosting Habitat

- 25 i. If a sandhill crane roost site is located within 0.75 mile of the construction area  
26 boundary, then to the extent feasible, nighttime (1 hour before sunset to 1 hour  
27 after sunrise) project activities will be relocated to maintain a 0.75-mile non-  
28 disturbance buffer. If this is not practicable, the following measures will be  
29 implemented to avoid and minimize effects on roosting sandhill cranes.
- 30 ii. DWR will avoid permanent impacts resulting in direct loss of roost sites. This can  
31 be accomplished by siting activities outside identified crane roost sites or by  
32 relocating the roost site if it consists of cultivated lands (roost sites that consist of  
33 wetlands rather than cultivated lands will not be subject to relocation). A  
34 cultivated land roost site can be relocated by not flooding the site where the  
35 impact will occur during years when construction will occur and by establishing a  
36 new roost site equal or greater in size at a new location away from the  
37 disturbance (outside the 50 dBA  $L_{eq}$  [1 hour] pile driving and general construction  
38 sound level contour) but within 1 mile of the affected roost site. The relocated  
39 roost site will be established 1 year prior to construction activities affecting the  
40 original roost site. A qualified biologist familiar with crane biology will design the  
41 new roost site and direct implementation of the roost site establishment. Potential  
42 sites will be identified and surveyed prior to establishment. Relocated roost sites  
43 will be maintained until construction is complete in the affected region. Prior to  
44 construction, a noise expert will create a sound level contour map showing the 50  
45 dBA sound level contour specific to the type and location of construction to occur  
46 in the area and existing noise barriers such as levees or embankments.

- 1           iii.    Avoid pile driving and general construction-related noise effects on known  
2           permanent and temporary roost sites as described below. Activities within 0.75  
3           mile of known roost sites will reduce pile driving and general construction noise  
4           during nighttime hours (from 1 hour before sunset to 1 hour after sunrise) such  
5           that pile-driving and general construction noise levels do not exceed a combined  
6           50 dBA  $L_{eq}$  (1 hour) at the nearest temporary or permanent roost sites during  
7           periods when the roost sites are available (flooded). This can be accomplished by  
8           limiting construction activities that could result in pile-driving and general  
9           construction noise levels above 50 dBA  $L_{eq}$  (1 hour) at the roost site to day time  
10          only (from 1 hour after sunrise to 1 hour before sunset); siting nighttime project  
11          activities to ensure that pile-driving and general construction noise levels do not  
12          exceed a combined 50 dBA  $L_{eq}$  (1 hour) at the roost site; relocating cultivated land  
13          or wetland roost sites as described above; and/or installing noise barriers  
14          between roost sites within the 50 dBA  $L_{eq}$  (1 hour) contour and the pile-driving  
15          and general construction noise source areas, such that construction noise levels at  
16          the roost site do not exceed 50 dBA  $L_{eq}$  (1 hour). The installation of noise barriers  
17          will be used only if the first three options cannot be implemented to the extent  
18          that noise levels do not exceed 50 dBA  $L_{eq}$  (1 hour) at the roost site. As described  
19          above, DWR will use shrouds or noise blankets to reduce noise from impact  
20          hammers or vibratory pile drivers at the intake work sites, which have been  
21          shown to reduce pile hammer noise by 8 to 23 dBA (Teachout and Cushman 2005;  
22          Washington State Department of Transportation 2018:7.15). All other options to  
23          reduce noise (e.g., installation of shrouds at pile driving locations at the intakes  
24          and other construction sites) will be implemented before installing noise barriers  
25          in close proximity to crane habitat. As described above, test piles constructed  
26          under field investigations and sound level surveys will determine site-specific  
27          considerations and feasibility for implementation of these measures.
- 28          iv.    If the roost site to be indirectly affected within the 50 dBA  $L_{eq}$  (1 hour) pile-  
29          driving and general construction combined sound level contour is a wetland roost  
30          site (natural wetlands) rather than flooded cultivated lands, then the existing  
31          wetland roost site will not be removed. A new, cultivated land roost site will be  
32          temporarily established at a new location away from the disturbance (outside the  
33          50 dBA  $L_{eq}$  (1 hour) sound level contour) but within 1 mile of the affected site, at a  
34          ratio of 1 acre created for each acre of temporary or permanent roost site within  
35          the pile-driving and general construction 50 dBA  $L_{eq}$  (1 hour) sound level contour.  
36          The new roost site will be established prior to commencement of the wintering  
37          season that occurs prior to construction activities potentially affecting the original  
38          roost site and will be maintained until the activities creating the indirect  
39          disturbance are completed. A qualified biologist familiar with crane biology will  
40          design the new roost site and direct implementation of the roost site  
41          establishment.

42          4. Measures to Avoid and Minimize Potential Effects from Lighting and Visual Disturbance

43          DWR has designed the project to minimize lighting and visual effects from traffic to reduce  
44          disturbance to sandhill cranes in the vicinity of Stone Lakes NWR. Project-related traffic on  
45          Hood-Franklin Road would be limited to shuttles bringing construction employees to and  
46          from the intake construction areas and the park and ride lot. In areas within 0.75 miles of

- 1 known sandhill crane roost sites, DWR will implement the following measures to avoid and  
2 minimize potential lighting and visual effects that could result from construction or  
3 operation and maintenance.
- 4 a. Route nighttime truck traffic to reduce headlight impacts in roosting habitat where  
5 feasible.
- 6 b. Require trucks traveling along the intake haul road to move continuously and not idle or  
7 stop along the haul road adjacent to Stone Lakes NWR.
- 8 c. Install light barriers, where there are no existing barriers, to block the line of sight  
9 between the nearest roosting areas and the primary nighttime construction light source  
10 areas.
- 11 d. Screen all construction-related lights and direct them down toward work activities and  
12 away from the night sky and nearby roost sites. A biological monitor will ensure that  
13 lights are properly directed at all times during construction.
- 14 e. Minimize the use of construction equipment greater than 50 feet in height to the extent  
15 feasible in light of project schedule and cost and logistical considerations.

16 5. Measures to Minimize Effects to Sandhill Cranes on Staten Island

17 Because of the density of greater sandhill cranes wintering on Staten Island and the  
18 importance of Staten Island to the existing population of the greater sandhill crane in the  
19 study area facilities will be placed to minimize disturbance to sandhill cranes at this site.  
20 Interested parties provided information used to identify the placement of the tunnel shaft  
21 on Staten Island (under Alternatives 1, 2a, 2b, and 2c) at a location at the northern portion  
22 of Staten Island in a previously disturbed area adjacent to a road and powerline (Delta  
23 Conveyance Design and Construction Authority 2022d:4). DWR will ensure that project-  
24 related construction will not result in a net decrease in crane use on Staten Island as  
25 determined by deriving greater sandhill crane use days for the entire winter period.<sup>2</sup> This  
26 standard will be achieved through some combination of the following (and including the  
27 above required avoidance and minimization measures).

- 28 a. Minimize noise, lighting, and visual disturbances during construction (see measures  
29 described above).
- 30 b. Minimize construction activity during the crane wintering season (September 15  
31 through March 15) to the extent feasible.
- 32 c. Provide supplemental feeding/foraging habitat enhancement as described above under  
33 *Minimize Effects on Sandhill Crane Foraging and Roosting Habitat Resulting from Water*  
34 *Conveyance Facilities Construction*.
- 35 d. Maintain flooding and irrigation capacity. DWR will work with land managers to stage  
36 construction activities on Staten Island such that they do not disrupt flooding and

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<sup>2</sup> Expected loss of crane use will be estimated by using data on crane use days/acre by habitat type on Staten Island from past studies and future monitoring before construction begins (using averages among available years). These will be used to predict the number of lost crane use days within the footprint of the habitat loss and within the 50 dBA  $L_{eq}$  (1 hour) pile-driving and general construction sound level contour. Preproject crane surveys will provide additional data on crane use day densities per habitat type to improve the prediction. Use day densities will be used to guide decisions regarding crop habitat needed to be maintained on Staten Island to maintain this performance standard during construction.

1 irrigation to the extent that greater sandhill crane habitat will be reduced during the  
2 crane wintering season.

3 Prior to construction on Staten Island, the qualified biologist will coordinate with DWR to  
4 develop a strategy for achieving no net decrease in crane use on Staten Island using a  
5 combination of the measures described above, and prepare a plan based on the final  
6 construction design on Staten Island that includes all avoidance and minimization measures  
7 necessary for achieving no net decrease in crane use on Staten Island. This plan will be  
8 subject to review and approval by the wildlife agencies prior to its implementation. All  
9 avoidance and minimization measures will be in place, consistent with the plan, prior to  
10 project construction on Staten Island.

#### 11 6. Bouldin Island Minimization Measures

12 Because of the regular use of temporary roost sites (cultivated lands) on Bouldin Island by  
13 sandhill cranes, DWR will place conveyance facilities and RTM to minimize disturbance to  
14 sandhill cranes at this site to the extent feasible. Interested parties provided information  
15 used to minimize impacts on habitat for special-status species on Bouldin Island and to  
16 prioritize placement of facilities and RTM along the southern, western, and northeastern  
17 portions of the island based on physical conditions and biological resources. DWR will  
18 implement some combination of the following (and including the above required avoidance  
19 and minimization measures).

- 20 a. Provide supplemental feeding/foraging habitat enhancement as described above under  
21 *Minimize Effects on Sandhill Crane Foraging and Roosting Habitat Resulting from Water*  
22 *Conveyance Facilities Construction.*
- 23 b. Maintain flooding and irrigation capacity. DWR will work with land managers to stage  
24 construction activities on Bouldin Island such that they do not disrupt flooding and  
25 irrigation to the extent that sandhill crane habitat will be reduced during the crane  
26 wintering season.

#### 27 ***Mitigation Impacts***

28 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
29 mitigation measure impacts. The analyses below consider the potential impacts associated with  
30 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
31 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
32 *Measures.*

#### 33 *Compensatory Mitigation*

34 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
35 species under the project's CMP would affect known temporary roost sites and modeled foraging  
36 habitat for greater and lesser sandhill cranes (Appendix 13C) from vegetation removal and grading  
37 to create the appropriate topography and soil conditions to establish or restore habitats. Noise or  
38 visual disturbance from construction activities associated with the CMP could also cause sandhill  
39 cranes to flush if activities are conducted during the crane winter use season when cranes are  
40 present in the Delta (September 15 through March 15).

41 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
42 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where



1 vernal pool complexes, alkaline seasonal wetlands, or grasslands are located, and could result in the  
2 temporary disturbances of sandhill cranes if activities are conducted during the crane winter use  
3 season when cranes are present in the Delta (September 15 through March 15). Site-specific  
4 analyses are not provided because locations of potential non-bank sites are not currently known.

5 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
6 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
7 management of agricultural areas but may also include natural communities in the study area  
8 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
9 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
10 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
11 CMP-22b: *Tricolored Blackbird Foraging Habitat*). Conversion and management of agricultural lands  
12 would provide foraging habitat of equal or greater habitat value for greater and lesser sandhill  
13 cranes and would maintain these lands in non-permanent crop types in perpetuity. Crop rotations,  
14 and related management activities would be conducted under a similar disturbance regime that  
15 greater and lesser sandhill crane would encounter under existing conditions but could result in  
16 temporary disturbances of sandhill cranes if activities are conducted during the crane winter use  
17 season when cranes are present in the Delta (September 15 through March 15). Grassland  
18 enhancement activities could also create temporary disturbances of greater and lesser sandhill  
19 cranes. Site-specific analyses are not provided because locations of potential protection instruments  
20 are not currently known.

21 Creation and enhancement of wetlands under the CMP that would create sandhill crane habitat  
22 could provide biogeochemical conditions for methylation of mercury in the newly inundated soils.  
23 There is potential for increased exposure of the foodwebs to methylmercury in these areas, with the  
24 level of exposure dependent on the amounts of mercury available in the soils and the  
25 biogeochemical conditions which has the potential to exacerbate bioaccumulation of mercury in  
26 greater sandhill crane and lesser sandhill crane. Potential effects of increased mercury exposure are  
27 likely low for sandhill cranes because they primarily forage on lower-trophic items with less  
28 potential to biomagnify mercury such as waste grains and, to a lesser extent, invertebrates  
29 associated with cultivated crops. Because Bouldin Island and the I-5 ponds sites consist of existing  
30 managed and agricultural wetlands and ponds, wetland creation and enhancement are not expected  
31 to increase mercury methylation, relative to existing conditions. Monitoring and adaptive  
32 management plans as described in the CMP (Appendix 3F, Section 3F.7.2) would include mercury  
33 monitoring and adaptive management at Bouldin Island and the I-5 ponds to prevent increased  
34 mercury methylation, relative to existing conditions. Therefore, potential increased exposure to  
35 methylmercury resulting from restoration would not be expected to adversely affect greater  
36 sandhill crane and lesser sandhill crane populations.

37 Herbicides would be applied at CMP sites to remove nonnative vegetation for site preparation and to  
38 support establishment of new plantings. Natural habitats contribute fewer pesticides to receiving  
39 waters than agricultural areas where pesticides are applied. Any newly created wetlands or  
40 enhanced natural habitat could also filter stormwater to remove solids and either improve or have  
41 no effect on pesticide concentrations in discharges to receiving waters, relative to existing  
42 conditions. As such, restoration areas are expected to somewhat reduce, rather than increase, runoff  
43 of pesticides into adjacent waterbodies. Environmental Commitment EC-14: *Construction Best*  
44 *Management Practices for Biological Resources* (Appendix 3B) would ensure that herbicides would  
45 be applied in such a manner as to prevent primary or secondary poisoning of special-status species.

1 Implementation of habitat creation and enhancement under the CMP has the potential to result in  
2 conditions that promote CHABs, which could result in impacts on greater sandhill crane and lesser  
3 sandhill crane using created and/or enhanced wetland and aquatic habitats. High levels of  
4 microcystins in tissues and microcystin poisoning have been documented in other wetland bird  
5 species (Chen et al. 2009:3317) and could affect sandhill cranes if they forage in areas with  
6 conditions that promote CHABs. Monitoring and adaptive management plans as described in the  
7 CMP (Appendix 3F, Section 3F.7.2) would include CHAB monitoring and adaptive management at  
8 Bouldin Island and the I-5 ponds to prevent increased CHAB formation, relative to existing  
9 conditions. Therefore, the CMP would not result in increased CHAB formation that could cause  
10 substantial adverse impacts on greater sandhill crane and lesser sandhill crane, relative to existing  
11 conditions.

12 Wetland creation and enhancement may provide habitat for sandhill cranes, which could increase  
13 the risk of selenium toxicity to the species. It is difficult to determine whether the effects of potential  
14 increases in selenium bioavailability associated with restoration activities under the CMP would  
15 lead to adverse effects on sandhill cranes. Potential effects of increased selenium exposure are likely  
16 low for sandhill cranes because they primarily forage on lower-trophic items with less potential to  
17 biomagnify selenium such as waste grains and, to a lesser extent, invertebrates associated with  
18 cultivated crops, and existing selenium concentrations in the Sacramento River watershed are low  
19 (Central Valley Regional Water Quality Control Board 1988:14). Toxicity thresholds have not been  
20 established for sandhill cranes; however, modeled concentrations in insect-eating bird eggs under  
21 existing conditions in the Delta were below levels of concern for other bird species (Appendix 9J).  
22 Analysis included in Chapter 9 for Impact WQ-10: *Effects on Selenium Resulting from Facility*  
23 *Operations* found that compensatory mitigation would not result in a measurable increase in  
24 selenium concentrations or selenium bioavailability. Therefore, potential increased exposure to  
25 selenium resulting from restoration would not be expected to adversely affect greater sandhill crane  
26 and lesser sandhill crane populations.

27 The CMP and site-specific permitting approvals would account for any losses of sandhill crane  
28 habitat from habitat creation by adjusting the overall commitment of emergent wetland creation or  
29 restoration and grassland and cultivated lands protection (Appendix 3F, Section 3F.1, Section 3F.2.4,  
30 and Attachment 3F.1, Table 3F.1-3, CMP-0: *General Design Guidelines*) and therefore reduce any  
31 habitat losses associated with the CMP to less than significant. The creation and enhancement  
32 activities would also have the potential for the disruption of normal behaviors of sandhill crane.  
33 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
34 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
35 *Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best*  
36 *Management Practices for Biological Resources* (Appendix 3B); and Mitigation Measures NOI-1:  
37 *Develop and Implement a Noise Control Plan* (Chapter 24); and BIO-33: *Avoid and Minimize*  
38 *Disturbance of Sandhill Cranes* would minimize disturbances to habitat and reduce the potential for  
39 the disruption of normal behaviors of greater and lesser sandhill cranes to less than significant and  
40 avoid take of greater sandhill crane, as defined by Section 86 of the California Fish and Game Code.  
41 These impacts would be less than significant because the aforementioned measures would (1) train  
42 construction staff on protecting and minimizing disturbance of sandhill cranes, reporting  
43 requirements, and the ramifications for not following these measures; (2) implement spill  
44 prevention and containment plans that would avoid material spills that could affect suitable habitat;  
45 (3) minimize disturbance of noise from construction equipment and implement time of day  
46 restrictions on construction; (4) conduct surveys to identify areas of crane use and minimize

1 disturbance; and (5) have a biological monitor present that would ensure that non-disturbance  
2 buffers are intact and all protective measures are being implemented where applicable.

### 3 Other Mitigation Measures

4 Some mitigation measures would involve ground disturbance, the use of heavy equipment, pile  
5 driving, or pesticides that would have the potential to expose greater sandhill crane and lesser  
6 sandhill crane to excessive noise, visual disturbance, dust, and hazardous materials that could cause  
7 loss of modeled habitat, disruption of normal behaviors, and injury or mortality. The mitigation  
8 measures with potential to result in impacts on greater sandhill crane and lesser sandhill crane are  
9 similar to those discussed under Impact BIO-31: *Impacts of the Project on Western Yellow-Billed*  
10 *Cuckoo*. Impacts on greater sandhill crane and lesser sandhill crane resulting from mitigation  
11 measures would be similar to construction effects of the project alternatives in certain construction  
12 areas and would contribute to greater sandhill crane and lesser sandhill crane impacts of the project  
13 alternatives.

14 The impacts of habitat loss, noise, visual disturbance, and exposure to dust or hazardous materials  
15 on greater sandhill crane and lesser sandhill crane would be reduced through the CMP,  
16 environmental commitments, and Mitigation Measure NOI-1: *Develop and Implement a Noise Control*  
17 *Plan* as detailed under Impact BIO-31: *Impacts of the Project on Western Yellow-Billed Cuckoo*. In  
18 addition, Mitigation Measure BIO-33: *Avoid and Minimize Disturbance of Sandhill Cranes* would  
19 require species-specific measures to reduce these impacts. Therefore, impacts on great sandhill  
20 crane and lesser sandhill crane from implementation of other mitigation measures would be  
21 reduced to less than significant.

22 Overall, the impacts on greater sandhill crane and lesser sandhill crane from construction of  
23 compensatory mitigation and implementation of other mitigation measures, combined with project  
24 alternatives, would not change the impact conclusion of less than significant with mitigation.

### 25 **Impact BIO-34: Impacts of the Project on California Least Tern**

26 The methods for the analysis of effects on California least tern appear in Section 13.3.1.1, and  
27 information on the species' life history and habitat suitability model are presented in the species  
28 account in Appendix 13B, Section 13B.60, *California Least Tern*.

### 29 All Project Alternatives

#### 30 Construction

31 The construction of all the project alternatives would affect modeled foraging habitat for California  
32 least tern. The loss of foraging habitat would primarily occur as a result of construction of the  
33 intakes (all alternatives), and from the construction of the Southern Forebay (Alternatives 1, 2a, 2b,  
34 2c, 3, 4a, 4b, and 4c; Appendix 13C). The central alignment alternatives (Alternatives 1, 2a, 2b, and  
35 2c) would also result in impacts on modeled foraging habitat because of road improvements of an  
36 existing bridge, and the construction of a new bridge and roadway between Mandeville Island and  
37 Bacon Island. The potential for California least tern to be affected by the loss of modeled foraging  
38 habitat as a result of these activities is low because California least terns typically forage within 1 to  
39 2 miles of their nest sites or colonies (Atwood and Minsky 1983:70) and the majority of modeled  
40 habitat loss is occurring at distances greater than 2 miles from known nesting locations. The nearest  
41 nesting location to the habitat loss is the Sacramento Regional Wastewater Treatment Plant

1 (Bufferlands) east of I-5, where a single breeding pair was last observed in 2021 (Conard 2018:35;  
 2 eBird 2021). The Sacramento Regional Wastewater Treatment Plant is located approximately 3  
 3 miles east of modeled habitat affected by the construction of Intake A (Alternatives 2a and 4a), 4  
 4 miles east of modeled habitat affected by the construction of Intake B (Alternatives 1, 2a, 2c, 3, 4a,  
 5 4c, and 5), and 6 miles east of modeled habitat affected by the construction of Intake C (Alternatives  
 6 1, 2a, 2b, 2c, 3, 4a, 4b, 4c, and 5). The next nearest nesting location to the modeled foraging habitat  
 7 loss is a colony over 20 miles northwest of the new roads and road improvements described above  
 8 for the central alignment alternatives (Alternatives 1, 2a, 2b, and 2c) (California Department of Fish  
 9 and Wildlife 2020a). Acres of permanent and temporary impacts on modeled habitat for California  
 10 least tern are shown in Table 13-72.

11 **Table 13-72. Impacts on Modeled Foraging Habitat for California Least Tern by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	41.49	13.17	54.66
2a	54.26	13.17	67.43
2b	37.89	12.92	50.81
2c	40.25	13.17	53.42
3	37.88	5.44	43.32
4a	51.15	5.44	56.59
4b	34.78	5.2	39.98
4c	37.11	5.43	42.54
5	6.97	4.16	11.13

12 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 13 discussion in Section 13.3.1.2.  
 14

15 Construction activities that would result in the loss of modeled foraging habitat include in-water  
 16 construction and pile driving, excavation, and drilling. Construction-related noise and visual  
 17 disturbances could disrupt foraging behaviors for terns. Pile driving would be required for intake  
 18 and bridge construction which would create noise and vibration effects in and adjacent to modeled  
 19 foraging habitat. While 60 dBA has been used as a standard noise threshold for birds (California  
 20 Department of Transportation 2016:87), this standard is generally applied during the nesting  
 21 season, when birds are more vulnerable to behavioral modifications that can cause nest failure. All  
 22 lights used during nighttime construction would be downcast, cut-off type fixtures with non-glare  
 23 finishes, natural light qualities, and minimum intensity. Construction-related lighting would be  
 24 shielded and oriented in such a manner so as not to subject the immediate surroundings to extremes  
 25 in the levels of light, however, these types of light generate an ambient nighttime luminescence that  
 26 is visible from a distance. Construction activities could result in dust and the discharge of  
 27 construction-related fluids, which could also affect the species and its habitat if present in or  
 28 adjacent to work areas. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-  
 29 2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement*  
 30 *Spill Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14:  
 31 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these  
 32 potential impacts by (1) training construction staff on protecting the species, reporting  
 33 requirements, and the ramifications for not following these measures; (2) implementing spill  
 34 prevention and containment plans that would avoid material spills that could affect suitable habitat;

1 and (3) having a biological monitor present that would ensure that non-disturbance buffers are  
2 intact and all protective measures are being implemented, where applicable.

3 Construction activities are not expected to injure or kill California least tern individuals. In addition  
4 to the low probability that these areas would be used for foraging by California least tern, the tern is  
5 not limited by foraging habitat in the study area. If a bird forages in a region where construction,  
6 dredging, or drilling activities are occurring, the bird would be expected to avoid the slow-moving or  
7 stationary equipment. This avoidance would not constitute a behavioral modification that would  
8 negatively affect the species because individuals would avoid construction equipment as they would  
9 any other boat or floating object in the open water that could be present under baseline conditions.

10 Field investigations would be conducted prior and during construction under all alternatives to  
11 more specifically identify appropriate construction methods and design criteria addressed in the  
12 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
13 and address the establishment of geological and groundwater monitoring programs (Delta  
14 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
15 variety of ground-disturbing activities that would vary in duration from several hours to  
16 approximately 6 weeks (Section 3.15; Delta Conveyance Design and Construction Authority 2022a,  
17 2022b) and could result in impacts on foraging habitat and the disruption of normal behaviors of  
18 California least tern. Geotechnical investigations associated with the tunnels for all project  
19 alternatives, which include CPTs and soil borings, would result in impacts on habitat (Appendix  
20 13C). The West Tracy Fault Study and the Bethany Fault Study investigations would not impact  
21 modeled habitat for California least tern. The following field investigations would be conducted  
22 within proposed surface construction footprints of project facilities (including portions of tunnel  
23 alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT,  
24 groundwater testing and monitoring, monument installation, pile installation test methods at the  
25 north Delta intakes, pilot studies for settlement, agronomic testing, and utility potholing. These  
26 temporary impacts are not characterized as an additional loss of habitat because impacts for these  
27 locations have already been quantified within the construction-related footprints but could still  
28 result in the disruption of normal behaviors of California least tern, as discussed above for  
29 conveyance facility construction. Environmental Commitments EC-1: *Conduct Worker Awareness*  
30 *Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and*  
31 *Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*;  
32 and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would  
33 reduce these potential impacts by (1) training construction staff on protecting the species, reporting  
34 requirements, and the ramifications for not following these measures; (2) implementing spill  
35 prevention and containment plans that would avoid material spills that could affect suitable habitat;  
36 and (3) having a biological monitor present that would ensure that non-disturbance buffers are  
37 intact and all protective measures are being implemented, where applicable. Noise and visual  
38 disturbances from helicopter surveys to identify buried groundwater and natural gas wells  
39 throughout the project area and pile installation test methods at the north Delta intakes may also  
40 cause disturbance to California least tern, if present in the study area as described above under  
41 construction-related effects.

#### 42 Operations

43 The operation of project facilities would not require ground disturbance or result in additional  
44 habitat loss, but project operations would generate small levels of noise, have permanent light  
45 sources, and require the periodic presence of staff and vehicle traffic. Noise from the operation of

1 the water conveyance facilities would not be discernably higher than existing conditions (Chapter  
2 24, Section 24.4.3.2). Permanent facility lighting could extend into California least tern foraging  
3 habitat. However, this is not likely to impair essential behavioral patterns because terns are visual  
4 hunters and do not forage at night, and, as stated in Chapter 3, Section 3.4.12, permanent lighting at  
5 project facilities would be motion activated, downcast, cut-off type fixtures with non-glare finishes,  
6 which would minimize the potential for this impact.

7 Power for construction and operation of the conveyance facilities has been designed to use existing  
8 power lines and underground conduit to the extent feasible under all project alternatives. Most new  
9 project lines would be placed on existing poles and towers and therefore would not substantially  
10 alter the existing landscape. New aboveground high-voltage transmission and SCADA lines  
11 constructed to power the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and  
12 Bethany Complex (Alternative 5) are approximately 14 miles from the nearest nesting colony  
13 (California Department of Fish and Wildlife 2020a), and 26 miles south of the Bufferlands nesting  
14 location (Conard 2018:35; eBird 2021) and therefore would not pose a collision risk to California  
15 least tern (Chapter 3, Figure 3-13 and Figure 3-14). Three aboveground project lines occur within 5  
16 miles of the recorded Bufferlands nesting location (Conard 2018:35; eBird 2021): (1) A SCADA line  
17 placed on existing towers along Florin Avenue to Freeport Boulevard and then extending south to  
18 Cosumnes River Boulevard, just over 2 miles northwest of the Bufferlands occurrence (2) a SCADA  
19 line placed on existing towers to provide power to Intake A, approximately 2.19 miles southwest of  
20 the Bufferlands occurrence, and (3) a transmission line placed on existing towers along Franklin  
21 Boulevard toward Lambert Road, approximately 4.5 miles south of the Bufferlands occurrence  
22 (Chapter 3, Figure 3-13 and Figure 3-14). The existing lines and towers along Florin Avenue and  
23 Franklin Boulevard do not pose a collision risk for California least tern because they are not located  
24 between the Bufferlands nesting occurrence and modeled foraging habitat and the new project lines  
25 at that location would similarly pose no collision risk to the species. The risk of collision with the  
26 SCADA line providing power to Intake A is minimal because typical California least tern foraging  
27 distance is within 2 miles of their nest sites or colonies (Atwood and Minsky 1983:70). Terns exhibit  
28 low wing loading and high aspect-ratio wings and as a result can maneuver relatively quickly  
29 around an obstacle such as a transmission line (Bevanger 1998:69). Because of distance of  
30 aboveground transmission lines to nesting occurrences, and the species' highly maneuverable flight  
31 behavior, it is highly unlikely that California least tern would experience collisions with project  
32 transmission lines.

33 Project activities have the potential to exacerbate the bioaccumulation of mercury in the California  
34 least tern. The operational impacts of new flows with project operations were analyzed to assess  
35 potential effects on mercury concentration and bioavailability, discussed in detail in Chapter 9.  
36 Although the magnitude of methylmercury bioaccumulation differs among species, largemouth bass  
37 were used as an indicator species for this analysis because they are good indicators of mercury  
38 contamination throughout the aquatic foodweb (Wood et al. 2010:67) and results would be  
39 expected to be similar for the California least tern, as least tern consumes fish and is likely to forage  
40 at a similar trophic level as largemouth bass. Results indicated that changes in methylmercury levels  
41 in water and largemouth bass tissues were insignificant.

42 California least tern forages on fish in open water habitats of the Delta, where localized  
43 environmental conditions may be present to support CHABs. Although microcystin toxicity has not  
44 been studied in California least tern, high levels of microcystins have been identified in other  
45 piscivorous birds, thus least terns may be at risk of death or reproductive harm due to microcystin  
46 toxicity (Chen et al. 2009:3317). Operation of all project alternatives is not expected to substantially

1 change the five factors that could create conditions more conducive to CHAB formation (i.e.,  
2 temperature, residence time, nutrients, water velocities and associated turbulence and mixing, and  
3 water clarity and associated irradiance) relative to existing conditions within the Delta (Chapter 9).  
4 The water quality modeling results show a potential for increased residence time in some locations  
5 and months within the central Delta, namely Discovery Bay where residence times are already very  
6 long, which could contribute to increased *Microcystis* bloom size in some years at these locations if  
7 the remaining four environmental factors were also at levels conducive to forming CHABs.  
8 Nevertheless, based on known *Microcystis* dynamics in the Delta a small increase of residence time  
9 at Discovery Bay would not cause *Microcystis* blooms to substantially increase in size or last  
10 substantially longer, relative to existing conditions. Because the project alternatives, through their  
11 effects on the five factors potentially associated with CHABs in the Delta, are not expected to cause  
12 Delta CHABs to be substantially larger in size, and because bloom size does not necessarily dictate  
13 toxin concentration in the water, the project alternatives are not expected to substantially increase  
14 microcystin or any other cyanotoxins in the Delta that could cause a substantial adverse impact on  
15 California least tern, relative to existing conditions.

16 Current use and legacy pesticides have the potential to bioaccumulate in the prey of piscivorous  
17 birds such as California least tern. Operation of all project alternatives and potential runoff from  
18 project facilities would not result in substantial increases in pesticide concentrations in Delta waters  
19 or in Delta outflows and would not result in land-use changes that would increase use of pesticides,  
20 relative to existing conditions. Therefore, the project alternatives would not substantially increase  
21 pesticide exposure to California least tern. Environmental Commitment EC-14: *Construction Best*  
22 *Management Practices for Biological Resources* (Appendix 3B) would ensure that herbicides used  
23 during maintenance activities would be applied in such a manner as to prevent primary or  
24 secondary poisoning of California least tern.

25 Selenium concentrations increase with trophic level and birds that consume prey with high levels of  
26 selenium have a higher risk of selenium toxicity (Ackerman and Eagles-Smith 2009:2139), therefore  
27 California least tern, which forages on small fish, may be at elevated risk of selenium toxicity.  
28 Modeled selenium concentrations in fish tissue and the eggs of fish-eating birds, such as least tern,  
29 were below the level of concern for other bird species and did not differ substantially from existing  
30 conditions under all alternatives (Appendix 9J). Therefore, the project alternatives are not  
31 anticipated to substantially increase the risk of selenium contamination in California least tern.  
32 Therefore, the potential of very low-level increase exposure to selenium resulting from the CMP  
33 would not be expected to cause a substantial adverse impact on California least tern populations.

#### 34 Maintenance

35 Maintenance activities include sediment and debris removal at the intakes and the Southern  
36 Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c), gate recalibration and repairs at the intakes,  
37 regrading of access roads, erosion control, embankment repairs, and monitoring of seepage flows.  
38 Maintenance-related actions are not expected to injure or kill California least tern individuals  
39 because the potential for birds to occur is very low. In addition, if a bird forages in a region where  
40 maintenance activities are occurring, the bird would be expected to avoid the slow-moving or  
41 stationary equipment. As described above under construction-related effects, this avoidance would  
42 not constitute a behavioral modification that would negatively affect the species because individuals  
43 would avoid maintenance equipment, and related noise or visual disturbance as they would any  
44 other boat or floating object in open water that could be present under baseline conditions.

1 Maintenance activities would generally be conducted during the day, except for emergency  
2 maintenance, and would therefore not require additional lighting.

### 3 **CEQA Conclusion—All Project Alternatives**

4 Construction, operations, and maintenance of the water conveyance facilities under all project  
5 alternatives could result in the disruption of normal behaviors of foraging California least terns from  
6 noise or human presence. The project would result in the loss of modeled California least tern  
7 foraging habitat; however, that loss would be less than significant because the loss represents a very  
8 small percentage of available foraging habitat (0.12% to 0.36%) and because foraging habitat is not  
9 considered a limited resource in the study area. Although no mitigation is specifically proposed for  
10 California least tern, tidal perennial aquatic habitat would be created or acquired and permanently  
11 protected to compensate for project impacts and ensure no significant loss of tidal perennial aquatic  
12 habitat functions and values (Appendix 3F, Section 3F.4.3 and Attachment 3F.1, Table 3F.1-2, CMP-1:  
13 *Tidal Perennial Aquatic Habitat*), some of which may provide suitable foraging habitat for California  
14 least tern. For all project alternatives, changes in water operations would not be expected to result  
15 in a measurable increase in mercury or selenium bioavailability or increased pesticide or  
16 microcystin exposure to California least tern. The potential impacts of project construction,  
17 operations, and maintenance activities would be reduced by Environmental Commitments EC-1:  
18 *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management*  
19 *Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11:  
20 *Fugitive Dust Control*; and EC-14: *Construction Best Management Practices for Special-Status Species*  
21 (Appendix 3B); however, even with these commitments, the impacts of the project alternatives on  
22 California least tern would be significant. Mitigation Measures AES-4b: *Minimize Fugitive Light from*  
23 *Portable Sources Used for Construction*; AES-4c: *Install Visual Barriers along Access Routes, Where*  
24 *Necessary, to Prevent Light Spill from Truck Headlights toward Residences* (Chapter 18), NOI-1:  
25 *Develop and Implement a Noise Control Plan* (Chapter 24); BIO-2b: *Avoid and Minimize Impacts on*  
26 *Biological Resources from Maintenance Activities*; BIO-2c: *Electrical Power Line Support Placement*;  
27 and BIO-34: *Avoid California Least Tern Nesting Colonies and Minimize Indirect Effects on Colonies*  
28 would be required to avoid and minimize the potential for disruption of normal behaviors, and  
29 disturbances to habitat, and to avoid take, as defined under Section 86 of the California Fish and  
30 Game Code. The impacts on California least tern from the project alternatives would be less than  
31 significant with mitigation because the aforementioned measures would reduce direct effects on the  
32 species, including habitat, noise, and visual disturbances, by providing environmental awareness  
33 training to construction personnel, by implementing protective measures during maintenance  
34 activities, and species-specific avoidance measures for the species during construction.

### 35 **Mitigation Measure CMP: Compensatory Mitigation Plan**

36 The CMP (see Impact BIO-1 for a summary discussion of the CMP) does not include specific  
37 compensatory mitigation for California least tern. However, the proposed tidal restoration  
38 activities (Appendix 3F, Section 3F.4.3.2.2 and Attachment 3F.1, Table 3F.1-2, CMP-1: *Tidal*  
39 *Perennial Aquatic Habitat*) could provide benefits to California least tern as tidal perennial  
40 aquatic habitat would be created or acquired and permanently protected to compensate for  
41 project impacts and ensure no significant loss of tidal perennial aquatic habitat functions and  
42 values (Appendix 3F, Section 3F.4.3 and Attachment 3F.1, Table 3F.1-2, CMP-1: *Tidal Perennial*  
43 *Aquatic Habitat*), some of which may be suitable foraging habitat for the species.



1           **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for**  
2           **Construction**

3           See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

4           **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary,**  
5           **to Prevent Light Spill from Truck Headlights toward Residences**

6           See description of Mitigation Measure AES-4c under Impact AES-4 in Chapter 18.

7           **Mitigation Measure NOI-1: Develop and Implement a Noise Control Plan**

8           See description of Mitigation Measure NOI-1 under Impact NOI-1 in Chapter 24.

9           **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
10          **Resources from Maintenance Activities**

11          See description of Mitigation Measure BIO-2b under Impact BIO-2.

12          **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

13          See description of Mitigation Measure BIO-2c under Impact BIO-2.

14          **Mitigation Measure BIO-34: Avoid California Least Tern Nesting Colonies and Minimize**  
15          **Indirect Effects on Colonies**

16          ***All Project Alternatives***

17          The following measures will be implemented to avoid and minimize impacts on California least  
18          tern nesting colonies and to avoid take of California least tern, as defined by Section 86 of the  
19          California Fish and Game Code.

- 20          1. If suitable nesting habitat for California least tern (flat, unvegetated areas near aquatic  
21          foraging habitat) is identified during planning-level surveys the year prior to construction,  
22          DWR will require that at least three preconstruction surveys for this species will be  
23          conducted in all suitable habitat within 500 feet of the construction footprint during the  
24          California least tern nesting season (April 15 to August 15). Surveys will be conducted by a  
25          USFWS- and CDFW-approved biologist with experience observing the species and its nests.  
26          Construction projects will be designed to avoid loss of California least tern nesting colonies  
27          if construction will take place within 500 feet of a California least tern nest during the  
28          nesting season (April 15 to August 15 or extended as determined through surveys).
- 29          2. A USFWS- and CDFW-approved wildlife biologist will monitor construction activities in the  
30          vicinity of the nests to ensure that construction activities do not affect nest success. Reduced  
31          buffers may be allowed, through coordination with USFWS and CDFW, if a full-time USFWS-  
32          and CDFW-approved biologist is present to monitor the nest and has authority to halt  
33          construction if bird behavior indicates continued activities could lead to nest failure. Active  
34          nests will be monitored to track progress of nesting activities until the biologist determines  
35          that the young have fledged and are capable of independent survival or the nest site is no  
36          longer active.

- 1           3. Only inspection, research, or monitoring activities may be performed during the least tern  
2           breeding season, in occupied least tern nesting habitat, with USFWS and CDFW approval and  
3           under the supervision of a USFWS- and CDFW-approved biologist.

#### 4           ***Mitigation Impacts***

5           As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
6           mitigation measure impacts. The analyses below consider the potential impacts associated with  
7           implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
8           Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
9           *Measures*.

#### 10          *Compensatory Mitigation*

11          California least tern is not expected to use the habitat creation and enhancement sites on Bouldin  
12          Island and the I-5 ponds because they do not provide tidal perennial aquatic habitat. However, the  
13          species may forage in aquatic habitat adjacent to tidal habitat creation sites.

14          In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
15          enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
16          vernal pool complexes, alkaline seasonal wetlands, or grasslands are located, and therefore would  
17          not result in effects on California least tern site-specific analyses are not provided because locations  
18          of potential non-bank sites are not currently known.

19          Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
20          crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
21          management of agricultural areas but may also include natural communities in the study area  
22          (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
23          *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
24          CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
25          CMP-22b: *Tricolored Blackbird Foraging Habitat*). These activities would not result in effects on  
26          California least tern. Site-specific analyses are not provided because locations of potential protection  
27          instruments are not currently known.

28          Creation and enhancement of wetlands under the CMP have the potential to increase  
29          methylmercury bioavailability, as newly wetted areas produce the biogeochemical conditions to  
30          methylate mercury existing in Delta soils; although least tern is less likely to use the restoration sites  
31          for foraging as they would not provide tidal perennial aquatic habitat. There is potential for  
32          increased exposure of foodwebs to methylmercury in these localized areas, with the level of  
33          exposure dependent on the amounts of mercury available in the soils and site-specific  
34          biogeochemical conditions. Increased methylmercury associated with restoration may affect  
35          California least tern via uptake through consumption of prey. Methylmercury concentrations in  
36          California least tern eggs are generally lower than for Forster's tern and Caspian tern, and one study  
37          found 9% of least terns sampled were at high risk of methylmercury toxicity, indicating that most  
38          were at low to moderate risk (Ackerman et al. 2014:13). Mitigation Measure WQ-6: *Develop and*  
39          *Implement a Mercury Management and Monitoring Plan*, which contains measures to assess the  
40          amount of mercury at tidal restoration sites before project development, followed by appropriate  
41          design, monitoring, and adaptation management, would minimize the potential for any effects of  
42          increased methylmercury exposure due to tidal restoration. Therefore, implementation of the CMP  
43          would not be expected to have a significant adverse impact on California least tern.

1 Herbicides would be applied at wetland creation and enhancement sites to remove nonnative  
2 vegetation for site preparation and to support establishment of new plantings. Natural habitats  
3 contribute fewer pesticides to receiving waters than agricultural areas where pesticides are applied.  
4 Any newly created wetlands or enhanced natural habitat could also filter stormwater to remove  
5 solids and either improve or have no effect on pesticide concentrations in discharges to receiving  
6 waters, relative to existing conditions. As such, restoration areas are expected to somewhat reduce,  
7 rather than increase, runoff of pesticides into adjacent waterbodies. Environmental Commitment  
8 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would ensure  
9 that herbicides would be applied in such a manner as to prevent primary or secondary poisoning of  
10 California least tern.

11 Tidal habitat creation under the CMP has the potential to result in conditions that promote CHABs,  
12 which could result in impacts on California least tern foraging near created tidal marsh habitats.  
13 High levels of microcystins in tissues and microcystin poisoning have been documented in other  
14 piscivorous bird species using other aquatic habitats (Chen et al. 2009:3317) and could affect  
15 California least tern if they forage in areas with conditions that promote CHABs. As discussed in  
16 Chapter 9, tidal habitat creation is not expected to cause substantial additional *Microcystis*  
17 production. Therefore, implementation of the CMP would not result in increased CHAB formation  
18 that could cause substantial adverse impacts on California least tern, relative to existing conditions.

19 Tidal restoration may result in mobilization of selenium in Delta sediments, which could increase  
20 the risk of selenium toxicity to piscivorous California least tern, although existing selenium  
21 concentrations in the Sacramento River watershed are low (Central Valley Regional Water Quality  
22 Control Board 1988:14). Toxicity thresholds have not been established for least terns; however,  
23 modeled concentrations in piscivorous bird eggs under existing conditions in the Delta were below  
24 levels of concern for other bird species (Appendix 9J) and least tern eggs in San Francisco Bay were  
25 similarly low (Hothem and Zador 1995:661; Schwarzbach and Adelsbach 2003:23). Analysis  
26 included in Chapter 9 for Impact WQ-10: *Effects on Selenium Resulting from Facility Operations* found  
27 that compensatory mitigation would not result in a measurable increase in selenium concentrations  
28 or selenium bioavailability. Therefore, potential increased exposure to selenium resulting from  
29 restoration would not be expected to cause substantial adverse impacts on California least tern  
30 populations. The impact on California least tern from the project with the CMP would be less than  
31 significant with mitigation.

### 32 *Other Mitigation Measures*

33 Some mitigation measures would involve ground disturbance, the use of heavy equipment, or pile  
34 driving that would have the potential to expose California least tern to excessive noise and visual  
35 disturbance that could cause loss of modeled foraging habitat and disruption of normal behaviors.  
36 The mitigation measures with potential to result in impacts on California least tern are similar to  
37 those discussed under Impact BIO-31: *Impacts of the Project on Western Yellow-Billed Cuckoo*.  
38 Impacts on California least tern resulting from mitigation measures would be similar to construction  
39 effects of the project alternatives in certain construction areas and would contribute to California  
40 least tern impacts of the project alternatives.

41 The impacts of noise and visual disturbance on California least tern would be reduced through  
42 environmental commitments and Mitigation Measure NOI-1: *Develop and Implement a Noise Control*  
43 *Plan* as detailed under Impact BIO-31: *Impacts of the Project on Western Yellow-Billed Cuckoo*. In  
44 addition, Mitigation Measure BIO-34: *Avoid California Least Tern Nesting Colonies and Minimize*

1 *Indirect Effects on Colonies* would require species-specific measures to reduce these impacts.  
 2 Therefore, impacts on California least tern from implementation of other mitigation measures would  
 3 be reduced to less than significant.

4 Overall, the impacts on California least tern from construction of compensatory mitigation and  
 5 implementation of other mitigation measures, combined with project alternatives, would not change  
 6 the impact conclusion of less than significant with mitigation.

### 7 **Impact BIO-35: Impacts of the Project on Cormorants, Herons, and Egrets**

8 The methods for the analysis of effects on nesting colonies/rookeries appear in Section 13.3.1.1, and  
 9 information on the species' life histories and habitat suitability models are presented in the  
 10 following species accounts in Appendix 13B: Section 13B.61, *Double-Crested Cormorant*, Section  
 11 13B.63, *Great Blue Heron*, Section 13B.64, *Great Egret*, Section 13B.65, *Snowy Egret*, and Section  
 12 13B.66, *Black-Crowned Night Heron*.

### 13 **All Project Alternatives**

#### 14 Construction

15 The construction of all the project alternatives would affect modeled nesting habitat for cormorants,  
 16 herons, and egrets. Effects from construction activities would include the permanent and temporary  
 17 loss of habitat, habitat fragmentation, and the potential for the disruption of normal behaviors,  
 18 injury, and mortality. The loss of habitat would primarily occur as a result of levee improvements,  
 19 new roads and road improvements, and construction of the intakes (Appendix 13C). The central  
 20 alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would result in greater impacts on modeled  
 21 habitat compared to the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and the  
 22 Bethany Reservoir alignment alternative (Alternative 5) largely because of the levee improvements  
 23 on Bouldin Island and road improvements throughout the central alignment. Acres of permanent  
 24 and temporary impacts on modeled habitat for cormorant, great blue heron, and great egret  
 25 rookeries are shown in Table 13-73 and for snowy egret and black-crowned night heron are shown  
 26 in Table 13-74. Environmental Commitment EC-14: *Construction Best Management Practices for*  
 27 *Special-Status Species* would ensure that temporarily disturbed areas are restored (Appendix 3B).

28 **Table 13-73. Impacts on Modeled Nesting Habitat for Double-Crested Cormorant, Great Blue**  
 29 **Heron, and Great Egret by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	19.77	11.20	30.97
2a	20.62	13.38	34.00
2b	14.70	12.42	27.12
2c	17.21	12.90	30.11
3	16.19	9.32	25.51
4a	18.89	9.95	28.84
4b	12.97	9.00	21.97
4c	15.48	9.46	24.94
5	19.19	8.74	27.93

30 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 31 discussion in Section 13.3.1.2.

1 **Table 13-74. Impacts on Modeled Nesting Habitat for Snowy Egret and Black-Crowned Night**  
 2 **Heron by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	25.08	16.55	41.63
2a	24.30	20.12	44.42
2b	18.17	18.88	37.05
2c	20.89	19.63	40.52
3	16.46	10.29	26.75
4a	19.15	10.92	30.07
4b	13.02	9.68	22.70
4c	15.75	10.44	26.19
5	19.67	9.59	29.26

3 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 4 discussion in Section 13.3.1.2.  
 5

6 The losses of habitat and potential for injury and mortality would result from vegetation removal in  
 7 advance of grading and excavation for the construction of project infrastructure. Vegetation removal  
 8 or trimming during the breeding season could damage nests and could result in the incidental loss of  
 9 fertile eggs or nestlings, or otherwise lead to nest abandonment. Construction-related noise and  
 10 visual disturbances during the breeding season could disrupt cormorant, heron, or egret rookeries  
 11 in the vicinity of work areas, which could alter foraging and nesting behaviors or cause nest or  
 12 entire rookery abandonment. While there is no data on effects of night lighting on these species,  
 13 studies show that birds of other species are attracted to artificial lights and this may disrupt their  
 14 behavioral patterns or cause collision-related fatalities (Gauthreaux and Belser 2006:67–86). All  
 15 lights used during nighttime construction would be downcast, cut-off type fixtures with non-glare  
 16 finishes, natural light qualities, and minimum intensity. Construction-related lighting would be  
 17 shielded and oriented in such a manner so as not to subject the immediate surroundings to extremes  
 18 in the levels of light, however, these types of light generate an ambient nighttime luminescence that  
 19 is visible from a distance. Effects of construction-related light would be greater at the intakes where  
 20 existing conditions are dark and rural in comparison with the Twin Cities Complex, Southern  
 21 Complex, and Bethany Complex where there are existing sources of light that may illuminate  
 22 suitable habitat. Construction activities could result in dust and the discharge of construction-  
 23 related fluids, which could also affect these species and their habitat if present in or adjacent to  
 24 work areas. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop*  
 25 *and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
 26 *Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14:  
 27 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these  
 28 potential impacts by (1) training construction staff on protecting cormorant, heron, or egret  
 29 rookeries, reporting requirements, and the ramifications for not following these measures; (2)  
 30 implementing spill prevention and containment plans that would avoid material spills that could  
 31 affect suitable habitat; and (3) having a biological monitor present that would ensure that non-  
 32 disturbance buffers are intact and all protective measures are being implemented, where applicable.

33 Cormorants, herons, and egrets are highly traditional in their use of nest sites (rookeries), in that  
 34 they use the same sites year after year. No recorded occurrences of cormorant, heron, or egret  
 35 rookeries would be permanently or temporarily affected by project construction for any of the

1 alternatives (California Department of Fish and Wildlife 2020a; California Department of Water  
2 Resources 2011). However, several rookeries have been recorded within 0.25 mile of construction  
3 activities (California Department of Water Resources 2011). Nesting great blue herons and double-  
4 crested cormorants have been recorded on an in-channel island (California Department of Water  
5 Resources 2011) that is approximately 0.12 mile east of levee improvements and associated roads  
6 and work areas on the eastern side of Bouldin Island (Alternatives 1, 2a, 2b, and 2c). A great egret  
7 rookery on Lower Roberts Island is approximately 66 feet south of proposed road improvements in  
8 support of an RTM storage area under the eastern alignment alternatives (Alternatives 3, 4a, 4b, and  
9 4c) and the Bethany Reservoir alignment alternative (Alternative 5). Nesting black-crowned night  
10 herons and great blue herons have also been recorded on Widdows Island and just west of the  
11 existing Clifton Court Forebay, approximately 0.25 mile from the proposed Southern Forebay and  
12 work areas (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c). Although modeled habitat is present within  
13 the construction footprint of the intakes and associated work areas, which would require the use of  
14 loud, heavy equipment and pile driving, there are no known cormorant, heron, or egret rookeries  
15 within 0.75 mile of the intakes under any alternative.

16 Field investigations would be conducted prior to and during construction under all project  
17 alternatives to more specifically identify appropriate construction methods and design criteria  
18 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
19 existing utilities, and address the establishment of geological and groundwater monitoring  
20 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
21 would involve a variety of ground-disturbing activities that would vary in duration from several  
22 hours to approximately 6 weeks (Section 3.15; Delta Conveyance Design and Construction Authority  
23 2022a, 2022b) and could result in impacts on habitat and the potential for injury, mortality, and the  
24 disruption of normal behaviors of cormorants, herons, and egrets. Geotechnical investigations  
25 associated the tunnels for all project alternatives, which include CPTs and soil borings, would result  
26 in impacts on modeled habitat for cormorants, herons, and egrets (Appendix 13C). The West Tracy  
27 Fault Study and the Bethany Fault Study investigations would not affect modeled habitat for  
28 cormorants, herons, and egrets. The following field investigations would be conducted within  
29 proposed surface construction footprints of project facilities (including portions of tunnel  
30 alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT,  
31 groundwater testing and monitoring, monument installation, pile installation test methods at the  
32 north Delta intakes, pilot studies for settlement, agronomic testing, and utility potholing. These  
33 temporary impacts are not characterized as an additional loss of habitat because impacts for these  
34 locations have already been quantified within the construction-related footprints but could still  
35 result in the potential for injury, mortality, and disruption of normal behaviors of cormorants,  
36 herons, and egrets if present in the vicinity, as discussed above for conveyance facility construction.  
37 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
38 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
39 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
40 *Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training  
41 construction staff on protecting cormorant, heron, or egret rookeries, reporting requirements, and  
42 the ramifications for not following these measures; (2) implementing spill prevention and  
43 containment plans that would avoid material spills that could affect suitable habitat; and (3) having  
44 a biological monitor present that would ensure that non-disturbance buffers are intact and all  
45 protective measures are being implemented, where applicable. Noise and visual disturbances from  
46 helicopter surveys to identify buried groundwater and natural gas wells throughout the project area

1 and pile installation test methods at the north Delta intakes may also cause disturbance to  
2 individuals, as described above under construction-related effects.

### 3 Operations

4 The operation of project facilities would not require ground disturbance or result in additional  
5 habitat loss, but project operations would generate small levels of noise, have permanent light  
6 sources, and require the periodic presence of staff and vehicle traffic. Noise from the operation of  
7 the water conveyance facilities would not be discernably higher than existing conditions (Chapter  
8 24, Section 24.4.3.2). Permanent facility lighting associated with project facilities under all  
9 alternatives could extend into suitable habitat for cormorants, herons, and egrets; however, as  
10 stated in Chapter 3, Section 3.4.12, permanent lighting at project facilities would be motion  
11 activated, downcast, cut-off type fixtures with non-glare finishes, and therefore permanent facilities  
12 would remain dark the majority of the time at night, which would minimize the potential for this  
13 impact.

14 Power for construction and operation of the conveyance facilities has been designed to use existing  
15 power lines and underground conduit to the extent feasible under all project alternatives. Most new  
16 project lines would be placed on existing poles and towers and therefore would not substantially  
17 alter the existing landscape. However, new aboveground high-voltage transmission and SCADA lines  
18 would be constructed to power the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c)  
19 and Bethany Complex under Alternative 5 (Chapter 3, Figure 3-13 and Figure 3-14). Waterbirds,  
20 particularly great blue herons and great egrets, have a moderate risk of electrocution from power  
21 lines because of their height and large wingspan (Avian Power Line Interaction Committee  
22 2006:37). However, the new proposed lines are all transmission towers that have adequate spacing  
23 between conductors to substantially reduce electrocution risk. Cormorants, herons, and egrets are  
24 not highly maneuverable because of their large wingspan and body shape, making them at a higher  
25 risk for collision with project lines, as they are less able to quickly avoid the lines (Avian Power Line  
26 Interaction Committee 2012:36-37). Because cormorants, herons, and egrets typically nest in  
27 colonies, flights related to nesting behaviors can expose multiple birds to increased collision risk if  
28 colonies are in the vicinity of transmission lines. There is minimal nesting habitat surrounding the  
29 transmission line that extends between the city of Brentwood and the Southern Complex  
30 (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) or the transmission lines powering the Bethany Complex  
31 (Alternative 5), but there is potential habitat and some potential for collision risk to cormorants,  
32 herons, and egrets around the transmission line that would be constructed from the Southern  
33 Complex around the east side of Clifton Court Forebay to the existing substation (Alternatives 1, 2a,  
34 2b, 2c, 3, 4a, 4b, and 4c).

35 Project operations have the potential to exacerbate the bioaccumulation of mercury in cormorants,  
36 herons, and egrets. Largemouth bass was used as an indicator species for analysis of impacts from  
37 changes in operations from the construction of the water conveyance facilities because they are  
38 good indicators of mercury contamination throughout the aquatic foodweb (Wood et al. 2010:67).  
39 Modeled effects of mercury concentrations from changes in operations of water conveyance  
40 facilities on largemouth bass did not differ substantially from existing conditions (Chapter 9) and  
41 results would be expected to be similar for cormorants, as cormorants consume fish and are likely to  
42 forage at a similar trophic level as largemouth bass. While herons and egrets forage in several  
43 habitats, methylmercury can be transported to other foodwebs via consumption of aquatic prey  
44 (Cristol et al. 2008:335), so the lack of substantial change in water column and riverine foodweb  
45 mercury concentrations indicates that mercury concentrations in adjacent foodwebs would also not

1 increase appreciably; therefore, these results indicate that mercury tissue concentrations of  
2 cormorants, herons, and egrets would not measurably increase as a result of project operation.

3 Cormorants, herons, and egrets forage on fish and other vertebrate prey in aquatic and terrestrial  
4 habitats of the Delta, where localized environmental conditions may be present to support CHABs.  
5 High levels of microcystins have been documented in black-crowned night heron and other  
6 waterbirds, thus rookery-nesting birds (cormorants, herons, and egrets) may be at risk of death or  
7 reproductive harm due to microcystin toxicity (Chen et al. 2009:3317, 3318, 3320). Operation of all  
8 project alternatives is not expected to substantially change the five factors that could create  
9 conditions more conducive to CHAB formation (i.e., temperature, residence time, nutrients, water  
10 velocities and associated turbulence and mixing, and water clarity and associated irradiance)  
11 relative to existing conditions within the Delta (Chapter 9). The water quality modeling results show  
12 a potential for increased residence time in some locations and months within the central Delta,  
13 namely Discovery Bay where residence times are already very long, which could contribute to  
14 increased *Microcystis* bloom size in some years at these locations if the remaining four  
15 environmental factors were also at levels conducive to forming CHABs. Nevertheless, based on  
16 known *Microcystis* dynamics in the Delta a small increase of residence time at Discovery Bay would  
17 not cause *Microcystis* blooms to substantially increase in size or last substantially longer, relative to  
18 existing conditions. Because the project alternatives, through their effects on the five factors  
19 potentially associated with CHABs in the Delta, are not expected to cause Delta CHABs to be  
20 substantially larger in size, and because bloom size does not necessarily dictate toxin concentration  
21 in the water, the project alternatives are not expected to substantially increase microcystin or any  
22 other cyanotoxins in the Delta that could cause a substantial adverse impact on cormorants, herons,  
23 or egrets, relative to existing conditions.

24 Current use and legacy pesticides have the potential to bioaccumulate in the prey of piscivorous  
25 birds such as cormorants, herons, and egrets. Operation of all project alternatives and potential  
26 runoff from project facilities would not result in substantial increases in pesticide concentrations in  
27 Delta waters or in Delta outflows, and would not result in land-use changes that would increase use  
28 of pesticides, relative to existing conditions. Therefore, the project alternatives would not  
29 substantially increase pesticide exposure to cormorants, herons, and egrets.

30 Selenium concentrations increase with trophic level and birds that consume prey with high levels of  
31 selenium have a higher risk of selenium toxicity (Ackerman and Eagles-Smith 2009:2139), therefore  
32 cormorants, herons, and egrets, which forage on small fish and other vertebrates, may be at elevated  
33 risk of selenium toxicity. Modeled selenium concentrations in fish tissue and the eggs of fish-eating  
34 birds, were below the level of concern, and did not differ substantially from existing conditions  
35 under all alternatives (Appendix 9J). Therefore, the project alternatives are not anticipated to  
36 substantially increase the risk of selenium contamination in cormorants, herons, and egrets.

### 37 Maintenance

38 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
39 in periodic disturbances that could affect cormorants, herons, and egrets. Maintenance activities at  
40 the north Delta intakes (all project alternatives) would include semiannual general and ground  
41 maintenance (e.g., mowing, vegetation trimming, herbicide application), annual sediment and debris  
42 removal at intakes, and periodic maintenance of the intake gates and associated structures  
43 approximately every 1 to 5 years. Maintenance activities at launch, reception, and maintenance  
44 shafts along the central alignment (Alternatives 1, 2a, 2b, and 2c), eastern alignment (Alternatives 3,



1 4a, 4b, and 4c), and the Bethany Reservoir alignment (Alternative 5) would include similar  
2 semiannual general and ground maintenance in addition to daily inspections by vehicle. Existing  
3 access roads in the vicinity of the intakes and shafts would be repaved every 15 years, which could  
4 cause noise or visual disturbance or cause dust in the vicinity of rookeries if present within the work  
5 areas. Maintenance at the Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) would also  
6 include annual embankment repair. Herbicide application could reduce the functions of nesting and  
7 habitat and result in direct mortality of individuals if present. Adults and fledged young would be  
8 expected to avoid slow-moving maintenance equipment and therefore there would be a low  
9 probability of vehicle strikes of nonbreeding birds. If vegetation removal and other maintenance  
10 activities take place during the breeding season (February 1 through August 31), they could disrupt  
11 foraging and nesting behaviors and result in potential injury and mortality of individuals.  
12 Maintenance activities would generally be conducted during the day, except for emergency  
13 maintenance, and would therefore not require additional lighting. Noise effects from maintenance  
14 activities could negatively affect cormorants, herons, and egrets, as described above under  
15 construction-related effects.

#### 16 ***CEQA Conclusion—All Project Alternatives***

17 Construction, operations, and maintenance of the water conveyance facilities under all project  
18 alternatives would result in impacts on cormorants, herons, and egrets through the permanent and  
19 temporary loss of modeled habitat and the potential for injury, mortality, and the disruption of  
20 normal behaviors. For all project alternatives, changes in water operations would not be expected to  
21 result in a measurable increase in mercury or selenium bioavailability or increased pesticide or  
22 microcystin exposure to cormorants, herons, and egrets. The temporary impacts on habitat and  
23 potential impacts of injury, mortality, or the disruption of normal behaviors from project  
24 construction, operations, and maintenance activities would be reduced by Environmental  
25 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
26 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
27 *Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best Management*  
28 *Practices for Special-Status Species* (Appendix 3B); however, even with these commitments, the  
29 impacts of the project alternatives on cormorants, herons, and egrets would be significant. The CMP  
30 would be required to offset the loss of riparian and emergent wetland habitat (Appendix 3F, Section  
31 3F.3.2.3 and Section 3F.4.3), which would reduce the impact associated with habitat loss to less than  
32 significant. Mitigation Measures AES-4b: *Minimize Fugitive Light from Portable Sources Used for*  
33 *Construction*; AES-4c: *Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light*  
34 *Spill from Truck Headlights toward Residences* (Chapter 18); NOI-1: *Develop and Implement a Noise*  
35 *Control Plan* (Chapter 24); BIO-2b: *Avoid and Minimize Impacts on Biological Resources from*  
36 *Maintenance Activities*; BIO-2c: *Electrical Power Line Support Placement*; and BIO-35: *Avoid and*  
37 *Minimize Impacts on Cormorant, Heron, and Egret Rookeries* would be required to avoid and  
38 minimize the potential for injury, mortality, or the disruption of normal behaviors and disturbances  
39 to habitat. The impacts on cormorants, herons, and egrets from the project alternatives would be  
40 less than significant with mitigation because the aforementioned measures would replace lost  
41 habitat, reduce direct effects on the species, including habitat, noise, and visual disturbances, by  
42 providing environmental awareness training to construction personnel, by implementing protective  
43 measures during maintenance activities, and avoidance measures for cormorant, heron, or egret  
44 rookeries during construction.

1           **Mitigation Measure CMP: Compensatory Mitigation Plan**

2           The CMP (see Impact BIO-1 for a summary discussion of the CMP) would offset the loss of  
3           riparian and emergent wetland habitat (Appendix 3F, Section 3F.3.2.3) by creating riparian  
4           habitat on Bouldin Island and at the I-5 ponds, and by creating or restoring channel margin  
5           enhancement and tidal emergent wetlands (Appendix 3F, Section 3F.4.3, *Tidal Habitat*  
6           *Mitigation Framework*) and managing these areas in perpetuity.

7           **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for**  
8           **Construction**

9           See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

10          **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary,**  
11          **to Prevent Light Spill from Truck Headlights toward Residences**

12          See description of Mitigation Measure AES-4c under Impact AES-4 in Chapter 18.

13          **Mitigation Measure NOI-1: Develop and Implement a Noise Control Plan**

14          See description of Mitigation Measure NOI-1 under Impact NOI-1 in Chapter 24.

15          **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
16          **Resources from Maintenance Activities**

17          See description of Mitigation Measure BIO-2b under Impact BIO-2.

18          **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

19          See description of Mitigation Measure BIO-2c under Impact BIO-2.

20          **Mitigation Measure BIO-35: Avoid and Minimize Impacts on Cormorant, Heron, and Egret**  
21          **Rookeries**

22          ***All Project Alternatives***

23          Cormorants, herons, and egrets are highly traditional in their use of nest sites (rookeries), in  
24          that they use the same sites year after year. To reduce impacts on rookeries, DWR will  
25          implement the following measures prior to construction activities.

- 26          1. To the maximum extent feasible, vegetation removal and trimming will be scheduled during  
27          the nonbreeding season of birds (September 1 through January 31). Vegetation trimming  
28          will not remove known nests. If a rookery needs to be removed, DWR will contact CDFW  
29          prior to removal and removal will occur during the nonbreeding season (September 1  
30          through January 31). Preconstruction surveys of previously occupied colonies and all  
31          suitable habitat within 500 feet of the project footprint and compensatory mitigation sites  
32          will be conducted during the breeding (February 1 through August 31) season by a qualified  
33          biologist with experience observing cormorants, herons, and egrets and their nests. If there  
34          is a break in construction of 3 calendar days or more, surveys will be conducted prior to  
35          restarting construction in the area.

- 1           2. To the maximum extent feasible, major construction activities that will occur within 500 feet  
2           of an active cormorant, heron, or egret rookery (including ground-nesting cormorants) will  
3           be avoided during the breeding season. If feasible, construction activities that will result in  
4           the greatest disturbance to an active cormorant, heron, or egret rookery will be deferred  
5           until after or as late in the breeding season as feasible. If construction must take place within  
6           500 feet of an active cormorant, heron, or egret rookery during the breeding season, a  
7           qualified biologist will monitor construction activities in the vicinity of the nests to ensure  
8           that construction activities do not affect nest success. The extent of the buffer will be  
9           determined by the qualified wildlife biologist(s) and will be established by taking into  
10          consideration the type and extent of the proposed activity occurring near the nest, the  
11          duration and timing of the activity, the line of sight between the nest and the disturbance,  
12          the sensitivity and the habituation of the birds and raptors to existing conditions, and the  
13          dissimilarity of the proposed activity to ambient levels of noise and other disturbances.  
14          Reduced buffers may be allowed if a full-time qualified biologist is present to monitor the  
15          nest and has authority to expand the buffer or halt construction if bird behavior indicates  
16          continued activities could lead to nest failure or if a bird is in the footprint during project  
17          activities.
- 18          3. Active nests will be monitored to track progress of nesting activities until the biologist  
19          determines that the young have fledged and are capable of independent survival or the nest  
20          site is no longer active.

## 21          ***Mitigation Impacts***

22          As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
23          mitigation measure impacts. The analyses below consider the potential impacts associated with  
24          implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
25          Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
26          *Measures*.

## 27          *Compensatory Mitigation*

28          The creation and enhancement of wetlands as well as habitat for special-status species under the  
29          project's CMP would affect cormorants, herons, and egrets through the permanent and temporary  
30          loss of habitat (Appendix 13C) from vegetation removal and grading to create the appropriate  
31          topography and soil conditions to establish or restore habitats on Bouldin Island and the I-5 ponds.  
32          Though no specific locations for channel margin enhancement and tidal wetland habitat creation  
33          have been identified, potential areas include the lower Yolo Bypass and Cache Slough complex. The  
34          activities to create these habitat types would generally include for channel margin enhancement the  
35          removal of existing riprap, modification of the existing channel margin with heavy equipment, and  
36          placement of large woody debris on the channel margin. For tidal restoration, activities would  
37          include grading, creation of setback levees, planting, and breaching of existing levees (Appendix 3F,  
38          Section 3F.4.3).

39          In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
40          enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
41          vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located, which do  
42          not provide habitat for cormorant, heron, or egret rookeries and therefore there would not likely be

1 any effects on these species. Site-specific analyses are not provided because locations of potential  
2 non-bank sites are not currently known.

3 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
4 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
5 management of agricultural areas but may also include natural communities in the study area  
6 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
7 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
8 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
9 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could potentially contain riparian  
10 habitat for cormorant, heron, or egret rookeries and management activities could affect this habitat  
11 and result in the disruption of normal behaviors, injury, and mortality. Site-specific analyses are not  
12 provided because locations of potential protection instruments are not currently known.

13 The CMP and site-specific permitting approvals would account for any losses of nesting habitat from  
14 habitat creation by adjusting the overall commitment of riparian creation (Appendix 3F, Section  
15 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-3, CMP-0: *General Design Guidelines*) and  
16 therefore reduce any habitat losses associated with the CMP to less than significant. The creation  
17 and enhancement activities would also have the potential for injury, mortality, and the disruption of  
18 normal behaviors of individuals if restoration activities occur during the breeding season (February  
19 1 through August 31), as described above under construction-related effects. Environmental  
20 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
21 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
22 *Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best Management*  
23 *Practices for Biological Resources* (Appendix 3B) and Mitigation Measures BIO-35: *Avoid and*  
24 *Minimize Impacts on Cormorant, Heron, and Egret Rookeries* would reduce the potential for injury,  
25 mortality, and the disruption of normal behaviors of individuals to less than significant. These  
26 impacts would be less than significant with mitigation because the aforementioned measures would  
27 (1) train construction staff on the needs of protecting nesting cormorants, herons, and egrets, the  
28 requirements for avoiding impacts, and the ramifications for not following these measures; (2)  
29 minimize dust; (3) implement spill prevention and containment plans that would avoid material  
30 spills that could affect habitat; (4) prior to and during implementing restoration and enhancement  
31 ground disturbance, establish protective buffers around occupied habitat; and (5) have a biological  
32 monitor present that would ensure that non-disturbance buffers are intact and all protective  
33 measures are being implemented where applicable.

34 Tidal restoration and creation and enhancement of wetlands on Bouldin Island and the I-5 ponds  
35 under the CMP have the potential to increase methylmercury bioavailability, as newly wetted areas  
36 produce the biogeochemical conditions to methylate mercury existing in Delta soils. There is  
37 potential for increased exposure of foodwebs to methylmercury in these localized areas, with the  
38 level of exposure dependent on the amounts of mercury available in the soils and site-specific  
39 biogeochemical conditions. Increased methylmercury associated with restoration may affect  
40 cormorants, herons, and egrets, via uptake through consumption of prey. Schwarzbach and  
41 Adelsbach (2003:26) investigated mercury exposure in 15 species of birds inhabiting the Bay-Delta  
42 ecosystem. Among the species studied, the highest concentrations of mercury were found in the eggs  
43 of piscivorous birds (terns and cormorants) that bioaccumulate mercury from their fish prey.  
44 Because Bouldin Island and the I-5 ponds sites consist of existing managed and agricultural  
45 wetlands and ponds, wetland creation and enhancement are not expected to increase mercury  
46 methylation, relative to existing conditions. Monitoring and adaptive management plans as

1 described in the CMP (Appendix 3F, Section 3F.7.2) would include mercury monitoring and adaptive  
2 management at Bouldin Island and the I-5 ponds to prevent increased mercury methylation, relative  
3 to existing conditions. Mitigation Measure WQ-6: *Develop and Implement a Mercury Management*  
4 *and Monitoring Plan*, which contains measures to assess the amount of mercury at tidal restoration  
5 sites before project development, followed by appropriate design, monitoring, and adaptation  
6 management, would minimize the potential for any effects of increased methylmercury exposure  
7 due to tidal restoration. Therefore, implementation of the CMP would not be expected to have a  
8 significant adverse impact on cormorants, herons, or egrets.

9 Herbicides would be applied at CMP creation and enhancement sites to remove nonnative  
10 vegetation for site preparation and to support establishment of new plantings. Natural habitats  
11 contribute fewer pesticides to receiving waters than agricultural areas where pesticides are applied.  
12 Any newly created wetlands or enhanced natural habitat could also filter stormwater to remove  
13 solids and either improve or have no effect on pesticide concentrations in discharges to receiving  
14 waters, relative to existing conditions. As such, restoration areas are expected to somewhat reduce,  
15 rather than increase, runoff of pesticides into adjacent waterbodies. Environmental Commitment  
16 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would ensure  
17 that herbicides would be applied in such a manner as to prevent primary or secondary poisoning of  
18 cormorants, herons, and egrets.

19 Implementation of habitat creation and enhancement under the CMP has the potential to result in  
20 conditions that promote CHABs, which could result in impacts on cormorants, herons, and egrets  
21 foraging near created or enhanced wetland habitats. High levels of microcystins in tissues and  
22 microcystin poisoning have been documented in other piscivorous bird species using other aquatic  
23 habitats (Chen et al. 2009: 3317) and could affect cormorants, herons, and egrets if they forage in  
24 areas with conditions that promote CHABs. Monitoring and adaptive management plans as  
25 described in the CMP (Appendix 3F, Section 3F.7.2) would include CHAB monitoring and adaptive  
26 management at Bouldin Island and the I-5 ponds to prevent increased CHAB formation, relative to  
27 existing conditions. As discussed in Chapter 9, tidal habitat creation is not expected to cause  
28 substantial additional *Microcystis* production. Therefore, the CMP would not result in increased  
29 CHAB formation that could cause substantial adverse impacts on cormorants, herons, or egrets,  
30 relative to existing conditions.

31 Selenium concentrations increase with trophic level and birds that consume prey with high levels of  
32 selenium have a higher risk of selenium toxicity (Ackerman and Eagles-Smith 2009:2139), therefore  
33 cormorants, herons, and egrets, which forage on small fish and other vertebrates, may be at elevated  
34 risk of selenium toxicity. Wetland creation and enhancement may result in mobilization of selenium  
35 in Delta sediments, which could increase the risk of selenium toxicity to cormorants, herons, and  
36 egrets. It is difficult to determine whether the effects of potential increases in selenium  
37 bioavailability associated with restoration activities under the CMP would lead to adverse effects on  
38 these species. Modeled concentrations in piscivorous bird eggs under existing conditions in the  
39 Delta were below levels of concern for other bird species (Appendix 9J) and most double-crested  
40 cormorant eggs in San Francisco Bay were similarly low (Ross et al. 2016:31), and existing selenium  
41 concentrations in the Sacramento River watershed are low (Central Valley Regional Water Quality  
42 Control Board 1988:14); therefore, the risk of impacts due to increased selenium exposure is also  
43 low. Analysis included in Chapter 9 for Impact WQ-10: *Effects on Selenium Resulting from Facility*  
44 *Operations* found that compensatory mitigation would not result in a measurable increase in  
45 selenium concentrations or selenium bioavailability. Therefore, potential increased exposure to  
46 selenium resulting from restoration would not be expected to adversely affect cormorant, heron,

1 and egret populations. The impact on cormorant, heron, and egret rookeries from the project with  
2 the CMP would be less than significant with mitigation.

### 3 Other Mitigation Measures

4 Some mitigation measures would involve ground disturbance, the use of heavy equipment, pile  
5 driving, or pesticides that would have the potential to expose cormorants, herons, and egrets to  
6 excessive noise, visual disturbance, dust, and hazardous materials that could cause loss of modeled  
7 habitat, disruption of normal behaviors, and injury or mortality. The mitigation measures with  
8 potential to result in impacts on cormorants, herons, and egrets are similar to those discussed under  
9 Impact BIO-31: *Impacts of the Project on Western Yellow-Billed Cuckoo*. Impacts on cormorants,  
10 herons, and egrets resulting from implementation of mitigation measures would be similar to  
11 construction effects of the project alternatives in certain construction areas and would contribute to  
12 cormorants, herons, and egrets impacts of the project alternatives.

13 The impacts of habitat loss, noise, visual disturbance, and exposure to dust or hazardous materials  
14 on cormorants, herons, and egrets would be reduced through the CMP, environmental  
15 commitments, and Mitigation Measure NOI-1: *Develop and Implement a Noise Control Plan* as  
16 detailed under Impact BIO-31: *Impacts of the Project on Western Yellow-Billed Cuckoo*. In addition,  
17 Mitigation Measure BIO-35: *Avoid and Minimize Impacts on Cormorant, Heron, and Egret Rookeries*  
18 would require species-specific measures to reduce these impacts. Therefore, impacts on cormorants,  
19 herons, and egrets from implementation of other mitigation measures would be reduced to less than  
20 significant.

21 Overall, the impacts on cormorants, herons, and egrets from construction of compensatory  
22 mitigation and implementation of other mitigation measures, combined with project alternatives,  
23 would not change the impact conclusion of less than significant with mitigation.

### 24 **Impact BIO-36: Impacts of the Project on Osprey, White-Tailed Kite, Cooper's Hawk, and** 25 **Other Nesting Raptors**

26 The methods for the analysis of effects on osprey, white-tailed kite, and Cooper's hawk appear in  
27 Section 13.3.1.1. Information on the species' life histories and habitat suitability models are  
28 presented in the following species accounts in Appendix 13B: Section 13B.67, *Osprey*, Section  
29 13B.68, *White-Tailed Kite*, and Section 13B.71, *Cooper's Hawk*. The same habitat is also suitable to  
30 support other nesting raptors.

### 31 **All Project Alternatives**

#### 32 Construction

33 The construction of all project alternatives would affect modeled habitat for osprey, white-tailed  
34 kite, and Cooper's hawk. Other nesting raptors (e.g., red-tailed hawk, great horned owl) use the  
35 same habitat. Effects on nesting raptors would include the permanent and temporary loss of habitat,  
36 habitat fragmentation, and the potential for the disruption of normal behaviors, injury, and  
37 mortality. The loss of nesting habitat would primarily occur as a result of levee improvements, new  
38 roads and road improvements, and construction of the intakes (Appendix 13C). The central  
39 alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would result in greater impacts on modeled  
40 habitat compared to the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and the  
41 Bethany Reservoir alignment alternative (Alternative 5) largely because of the levee improvements

1 on Bouldin Island and road improvements throughout the central alignment. Acres of permanent  
 2 and temporary impacts on modeled habitat for osprey, white-tailed kite, and Cooper's hawk are  
 3 shown in Table 13-75 through Table 13-77. Environmental Commitment EC-14: *Construction Best*  
 4 *Management Practices for Special-Status Species* would ensure that temporarily disturbed areas are  
 5 restored (Appendix 3B).

6 **Table 13-75. Impacts on Modeled Habitat for Osprey by Alternative**

Alternative	Permanent Impacts— Nesting (acres) <sup>a</sup>	Permanent Impacts— Foraging (acres) <sup>a</sup>	Temporary Impacts— Nesting (acres)	Temporary Impacts— Foraging (acres)	Total (acres)
1	16.92	24.56	9.23	13.31	64.02
2a	17.29	25.88	11.38	13.56	68.11
2b	12.24	20.72	10.48	13.02	56.46
2c	14.40	23.18	10.88	13.36	61.82
3	15.21	16.28	8.40	5.47	45.36
4a	17.39	18.14	9.04	5.67	50.24
4b	12.34	12.99	8.15	5.13	38.61
4c	14.50	15.45	8.55	5.47	43.97
5	17.55	8.04	7.82	4.36	37.77

7 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 8 discussion in Section 13.3.1.2.  
 9

10 **Table 13-76. Impacts on Modeled Nesting and Foraging Habitat for White-Tailed Kite by**  
 11 **Alternative**

Alternative	Permanent Impacts— Nesting (acres) <sup>a</sup>	Permanent Impacts— Foraging (acres) <sup>a</sup>	Temporary Impacts— Nesting (acres)	Temporary Impacts— Foraging (acres)	Total (acres)
1	16.92	2,512.40	9.23	262.41	2,800.96
2a	17.29	2,736.74	11.38	280.70	3,046.11
2b	12.24	2,220.93	10.48	277.28	2,520.93
2c	14.40	2,375.77	10.88	282.18	2,683.23
3	15.21	2,448.29	8.40	224.80	2,696.70
4a	17.39	2,706.64	9.04	224.74	2,957.81
4b	12.34	2,141.15	8.15	221.35	2,382.99
4c	14.50	2,317.14	8.55	226.22	2,566.41
5	17.55	1,557.01	7.82	111.76	1,694.14

12 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 13 discussion in Section 13.3.1.2.  
 14

15 **Table 13-77. Impacts on Modeled Nesting Habitat for Cooper's Hawk by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	19.77	11.19	30.96
2a	20.62	13.38	34.00

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
2b	14.70	12.41	27.11
2c	17.21	12.89	30.10
3	16.19	9.32	25.51
4a	18.89	9.94	28.83
4b	12.97	8.99	21.96
4c	15.48	9.46	24.94
5	19.19	8.74	27.93

<sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see discussion in Section 13.3.1.2.

The losses of nesting habitat and potential for injury and mortality would result from vegetation removal in advance of grading and excavation for the construction of project infrastructure. Construction activities and removal of suitable nest trees could result in the injury, mortality, or disturbance of raptors, including the incidental loss of fertile eggs or nestlings and nest abandonment. Because white-tailed kite is fully protected, removal of trees with active nests and activities that may result in loss of white-tailed kites is prohibited. There is wide variation in reported distances at which raptors are disturbed by human activities (Pacific Gas and Electric Company 2016:4-4), which makes broad generalizations about disturbance distances difficult. For the purpose of this analysis and based on typical guidance on disturbance distances from CDFW, any raptors nesting within 500 feet of the project footprint could potentially be disturbed by construction noise or vibration, potentially causing nest abandonment. Construction activities are not expected to injure or kill adults and fledged juveniles who are no longer dependent on adults. Night lighting may also have the potential to affect the behavior of nesting raptors or white-tailed kite roost sites, if present in the vicinity of work areas. However, all lights used during nighttime construction would be downcast, cut-off type fixtures with non-glare finishes, natural light qualities, and minimum intensity. Construction-related lighting would be shielded and oriented in such a manner so as not to subject the immediate surroundings to extremes in the levels of light, however, these types of light generate an ambient nighttime luminescence that is visible from a distance. Effects of construction-related light would be greater at the intakes where existing conditions are dark and rural in comparison with the Twin Cities Complex, Southern Complex, and Bethany Complex where there are existing sources of light that may illuminate suitable habitat. Construction activities could result in dust and the discharge of construction-related fluids, which could also affect these species and their habitat if present in or adjacent to work areas. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training construction staff on protecting nesting raptors, reporting requirements, and the ramifications for not following these measures; (2) implementing spill prevention and containment plans that would avoid material spills that could affect suitable habitat; and (3) having a biological monitor present that would ensure that non-disturbance buffers are intact and all protective measures are being implemented, where applicable.

The loss of white-tailed kite foraging habitat and foraging habitat for other raptors would primarily occur as a result of construction of the Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and from the placement of RTM (all alternatives; Appendix 13C). Lesser impacts on foraging habitat



1 would occur from the construction of the intakes (all alternatives) and the Bethany Complex  
2 (Alternative 5). Permanent and temporary foraging habitat loss from the construction of the levee  
3 improvements, and new roads or road improvements would remove relatively narrow slivers of  
4 grassland and cultivated lands that are less likely to be used by the species. Cooper's hawk typically  
5 forage in forests or shrublands with open edge habitats or in urban areas which are not modeled  
6 because those features are more detailed than the scale of the landcover mapping. However, impacts  
7 on foraging habitat for Cooper's hawk and other nesting raptors would be similar to those described  
8 above for Cooper's hawk nesting habitat and some portion of modeled white-tailed kite foraging  
9 habitat. The loss of osprey foraging habitat would also occur as a result of construction of the  
10 Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c; Appendix 13C) and the intakes, new  
11 roads, and road improvements associated with bridges (all alternatives; Appendix 13C).  
12 Construction activities would not be expected to result in injury or mortality while birds are  
13 foraging because raptors are highly mobile and would be expected to avoid direct injury or  
14 mortality from slow-moving or stationary construction equipment.

15 There are no CNDDDB occurrences of osprey or Cooper's hawk in the vicinity of project facilities  
16 under any alternative (California Department of Fish and Wildlife 2020a). There is one occurrence  
17 of white-tailed kite adjacent to a proposed access road associated with the Bethany Complex  
18 (Alternative 5) (California Department of Fish and Wildlife 2020a).

19 Field investigations would be conducted prior to and during construction under all project  
20 alternatives to more specifically identify appropriate construction methods and design criteria  
21 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
22 existing utilities, and address the establishment of geological and groundwater monitoring  
23 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
24 would involve a variety of ground-disturbing activities that would vary in duration from several  
25 hours to approximately 6 weeks (Section 3.15; Delta Conveyance Design and Construction Authority  
26 2022a, 2022b) and could result in impacts on habitat and the potential for injury, mortality, and the  
27 disruption of normal behaviors of nesting raptors. Geotechnical investigations associated with the  
28 tunnels for all project alternatives, which include CPTs and soil borings, would result in impacts on  
29 modeled white-tailed kite and osprey foraging habitat and small amounts of raptor nesting habitat  
30 (Appendix 13C). The West Tracy Fault Study and the Bethany Fault Study investigations would not  
31 affect modeled nesting habitat for Cooper's hawk, osprey, or white-tailed kite, or modeled foraging  
32 habitat for osprey, but they would occur within modeled foraging habitat for white-tailed kite and  
33 other raptors. The following field investigations would be conducted within proposed surface  
34 construction footprints of project facilities (including portions of tunnel alignments) and would  
35 temporarily affect habitat: test trenches, CPTs, soil borings, ERT, groundwater testing and  
36 monitoring, monument installation, pile installation test methods at the north Delta intakes, pilot  
37 studies for settlement, agronomic testing, and utility potholing. These temporary impacts are not  
38 characterized as an additional loss of habitat because impacts for these locations have already been  
39 quantified within the construction-related footprints but could still result in the potential for injury,  
40 mortality, and disruption of normal behaviors of raptors if present in the vicinity, as discussed above  
41 for conveyance facility construction. Environmental Commitments EC-1: *Conduct Worker Awareness*  
42 *Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and*  
43 *Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best*  
44 *Management Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts  
45 by (1) training construction staff on protecting nesting raptors, reporting requirements, and the  
46 ramifications for not following these measures; (2) implementing spill prevention and containment

1 plans that would avoid material spills that could affect suitable habitat; and (3) having a biological  
2 monitor present that would ensure that non-disturbance buffers are intact and all protective  
3 measures are being implemented, where applicable. Noise and visual disturbances from helicopter  
4 surveys to identify buried groundwater and natural gas wells throughout the project area and pile  
5 installation test methods at the north Delta intakes may cause disturbance to nesting raptors.

### 6 Operations

7 The operation of project facilities would not require ground disturbance or result in additional  
8 habitat loss, but project operations would generate small levels of noise, have permanent light  
9 sources, and require the periodic presence of staff and vehicle traffic. Noise from the operation of  
10 the water conveyance facilities would not be discernably higher than existing conditions (Chapter  
11 24, Section 24.4.3.2). Permanent facility lighting associated with project facilities under all  
12 alternatives could extend into nesting and foraging habitat; however, as stated in Chapter 3, Section  
13 3.4.12, permanent lighting at project facilities would be motion activated, downcast, cut-off type  
14 fixtures with non-glare finishes, and therefore permanent facilities would remain dark the majority  
15 of the time at night, which would minimize the potential for this impact.

16 Power for construction and operation of the conveyance facilities has been designed to use existing  
17 power lines and underground conduit to the extent feasible under all project alternatives. Most new  
18 project lines would be placed on existing poles and towers and therefore would not substantially  
19 alter the existing landscape. However, new aboveground high-voltage transmission and SCADA lines  
20 would be constructed to power the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c)  
21 and Bethany Complex under Alternative 5 (Chapter 3, Figure 3-13 and Figure 3-14). White-tailed  
22 kites and other diurnal raptors have highly developed eyesight (Potier et al. 2020:8; Mitkus et al.  
23 2018:1), allowing them to detect small prey. Keen eyesight also allows detection and avoidance of  
24 other aerial objects, including aboveground utility lines. Raptors, including white-tailed kite, osprey,  
25 and Cooper's hawks have narrow, tapered wings and body sizes that allow efficient soaring flight  
26 and highly developed aerial maneuverability (Bevanger 1998:69). Therefore, the general  
27 maneuverability and keen eyesight make the risk of collision with power lines low for raptors,  
28 relative to other avian species (Slater et al. 2020). Raptors are subject to electrocution from  
29 powerlines; however, most electrocutions of raptors occur at low voltage distribution lines because  
30 of the small spacing between uninsulated energized components (Slater et al. 2020:198). Large  
31 transmission lines such as the proposed project lines pose minimal electrocution risk because of the  
32 inherently large spacing required between the electrified components (Slater et al. 2020:198).

33 Changes in water operations under all project alternatives have the potential to exacerbate  
34 bioaccumulation of methylmercury in osprey, white-tailed kite, Cooper's hawk, and other nesting  
35 raptors. Methylmercury can be transported from aquatic to adjacent terrestrial foodwebs through  
36 ingestion of aquatic prey items, where it can biomagnify and expose terrestrial birds to high  
37 concentrations (Cristol et al. 2008:335). Because osprey are piscivorous birds, they are particularly  
38 at risk of mercury contamination due to biomagnification of methylmercury. Largemouth bass was  
39 used as an indicator species for analysis of impacts from changes in operations from the  
40 construction of the water conveyance facilities because they are good indicators of mercury  
41 contamination throughout the aquatic foodweb (Wood et al. 2010:67). Modeled effects of mercury  
42 concentrations from changes in operations of water conveyance facilities on largemouth bass did  
43 not differ substantially from existing conditions (Chapter 9, Appendix 9H); therefore, project  
44 operations are not expected to increase methylmercury exposure to osprey, white-tailed kite,  
45 Cooper's hawk, and other nesting raptors, relative to existing conditions.

1 Ospreys forage on fish in open water habitats of the Delta (Polite 2008:1), where localized  
2 environmental conditions may be present to support *Microcystis* blooms. Microcystins have also  
3 been found in terrestrial foodwebs, likely through consumption of emergent aquatic insects (Moy et  
4 al. 2016:A, E), and can affect Cooper's hawk if their prey forage in or near habitats with conditions  
5 that promote *Microcystis* blooms. Although microcystin toxicity has not been studied in osprey,  
6 white-tailed kite, Cooper's hawk, and other nesting raptors, high levels of microcystins have been  
7 identified in other piscivorous birds and riparian songbirds, thus osprey and Cooper's hawk may be  
8 at risk of death or reproductive harm due to microcystin toxicity (Chen et al. 2009:3317). Operation  
9 of all project alternatives is not expected to substantially change the five factors that could create  
10 conditions more conducive to CHAB formation relative to existing conditions within the Delta  
11 (Chapter 9). The water quality modeling results show a potential for increased residence time in  
12 some locations and months within the central Delta, namely Discovery Bay where residence times  
13 are already very long, which could contribute to increased *Microcystis* bloom size in some years at  
14 these locations if the remaining four environmental factors were also at levels conducive to forming  
15 CHABs. Nevertheless, based on known *Microcystis* dynamics in the Delta a small increase of  
16 residence time at Discovery Bay would not cause *Microcystis* blooms to substantially increase in size  
17 or last substantially longer, relative to existing conditions. Because the project alternatives, through  
18 their effects on the five factors potentially associated with CHABs in the Delta, are not expected to  
19 cause Delta CHABs to be substantially larger in size, and because bloom size does not necessarily  
20 dictate toxin concentration in the water, the project alternatives are not expected to substantially  
21 increase microcystin or any other cyanotoxins in the Delta that could cause a substantial adverse  
22 impact on osprey, white-tailed kite, Cooper's hawk, or other nesting raptors, relative to existing  
23 conditions.

24 Current use and legacy pesticides have the potential to bioaccumulate in the prey of raptors such as  
25 osprey, white-tailed kite, and Cooper's hawk. Operation of all project alternatives and potential  
26 runoff from project facilities would not result in substantial increases in pesticide concentrations in  
27 Delta waters or in Delta outflows, and would not result in land-use changes that would increase use  
28 of pesticides, relative to existing conditions (Chapter 9). Therefore, the project alternatives would  
29 not substantially increase pesticide exposure to osprey, white-tailed kite, Cooper's hawk, and other  
30 nesting raptors.

31 Selenium concentrations increase with trophic level and birds that consume prey with high levels of  
32 selenium have a higher risk of selenium toxicity (Ackerman and Eagles-Smith 2009: 2139);  
33 therefore, osprey, white-tailed kite, Cooper's hawk, and other nesting raptors, which forage on fish  
34 and small terrestrial vertebrates, may be at elevated risk of selenium toxicity. Modeled selenium  
35 concentrations in fish tissue and the eggs of fish-eating birds, such as osprey, were below the level of  
36 concern and did not differ substantially from existing conditions under all alternatives (Appendix  
37 9J). Therefore, the project alternatives are not anticipated to substantially increase the risk of  
38 selenium contamination in osprey, white-tailed kite, Cooper's hawk, and other nesting raptors.

### 39 Maintenance

40 The maintenance of aboveground water conveyance facilities for all project alternatives would  
41 result in periodic disturbances within and adjacent to nesting and foraging habitat for raptors.  
42 Maintenance activities at the north Delta intakes (all project alternatives) would include semiannual  
43 general and ground maintenance (e.g., mowing, vegetation trimming, herbicide application), annual  
44 sediment and debris removal at intakes, and periodic maintenance of the intake gates and  
45 associated structures approximately every 1 to 5 years. Maintenance activities at launch, reception,

1 and maintenance shafts along the central (Alternatives 1, 2a, 2b, and 2c), eastern (Alternatives 3, 4a,  
2 4b, and 4c), and Bethany Reservoir (Alternative 5) alignments would include similar semiannual  
3 general and ground maintenance in addition to daily inspections by vehicle. Existing access roads in  
4 the vicinity of the intakes and shafts would be repaved every 15 years and noise and visual  
5 disturbance from repaving equipment could disturb active nests in the vicinity of the work areas.

6 Large equipment or cranes required for maintenance of the intakes (all alternatives), Southern  
7 Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c), or Bethany Complex (Alternative 5) or any  
8 vegetation management that involves tree-trimming or tree removal could disrupt nesting  
9 behaviors or result in potential injury or mortality of individuals. Maintenance activities would  
10 generally be conducted during the day, except for emergency maintenance, and would therefore not  
11 require additional lighting.

### 12 ***CEQA Conclusion—All Project Alternatives***

13 Construction, operations, and maintenance of the water conveyance facilities under all project  
14 alternatives would result in impacts on special-status and non-special-status raptors through the  
15 permanent and temporary loss of modeled habitat and the potential for injury, mortality, and the  
16 disruption of normal behaviors. For all project alternatives, changes in water operations would not  
17 be expected to result in a measurable increase in mercury or selenium bioavailability or increased  
18 pesticide or microcystin exposure to osprey, white-tailed kite, Cooper’s hawk, and other nesting  
19 raptors. The temporary impacts on habitat and potential impacts of injury, mortality, or disruption  
20 of normal behaviors from project construction, operations, and maintenance would be reduced by  
21 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
22 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
23 *Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best*  
24 *Management Practices for Special-Status Species* (Appendix 3B); however, even with these  
25 commitments, the impacts of the project alternatives on special-status and non-special-status  
26 raptors would be significant. The CMP would be required to offset the loss of nesting and foraging  
27 habitat by creating and protecting riparian, tidal emergent wetland, and grassland habitat  
28 (Appendix 3F, Sections 3F.3.2.3, 3F.3.2.5, and 3F.3.3.2) on Bouldin Island and the I-5 ponds and by  
29 protecting agricultural foraging habitat for sandhill cranes, Swainson’s hawk, and tricolored  
30 blackbird (Appendix 3F, Attachment 3F.1, Table 3F.1-3, CMP-18b: *Sandhill Crane Foraging Habitat,*  
31 *CMP-19b: Swainson’s Hawk Foraging Habitat,* and *CMP-22b: Tricolored Blackbird Foraging Habitat*),  
32 and by creating or acquiring and permanently protecting tidal perennial aquatic habitat to ensure no  
33 significant loss of tidal perennial aquatic habitat functions and values (Appendix 3F, Section 3F.4.3  
34 and Attachment 3F.1, Table 3F.1-2, CMP-1: *Tidal Perennial Aquatic Habitat*) which would mitigate  
35 the loss of special-status and non-special-status nesting raptor nesting and foraging habitat to a  
36 less-than-significant level. Mitigation Measures AES-4b: *Minimize Fugitive Light from Portable*  
37 *Sources Used for Construction*; AES-4c: *Install Visual Barriers along Access Routes, Where Necessary, to*  
38 *Prevent Light Spill from Truck Headlights toward Residences* (Chapter 18), NOI-1: *Develop and*  
39 *Implement a Noise Control Plan* (Chapter 24); BIO-2b: *Avoid and Minimize Impacts on Biological*  
40 *Resources from Maintenance Activities*; BIO-2c: *Electrical Power Line Support Placement*; and BIO-  
41 36a: *Conduct Nesting Surveys for Special-Status and Non-Special-Status Birds and Raptors and*  
42 *Implement Protective Measures to Avoid Disturbance of Nesting Birds and Raptors*; and BIO-36b:  
43 *Conduct Preconstruction Surveys and Implement Protective Measures to Avoid Disturbance of White-*  
44 *Tailed Kite* would be required to minimize disturbance of habitat and avoid take of white-tailed kite,  
45 as defined by Section 86 of Fish and Game Code and would avoid and minimize the potential for

1 injury, mortality, or the disruption of normal behaviors and disturbances to habitat for osprey,  
2 Cooper's hawk, and other nesting raptors. The impacts on special-status and non-special-status  
3 raptors from the project alternatives would be less than significant with mitigation because the  
4 aforementioned measures would replace lost habitat, reduce direct effects on the species, including  
5 habitat, noise, and visual disturbances, by providing environmental awareness training to  
6 construction personnel, by implementing protective measures during maintenance activities, and  
7 avoidance measures for raptors during construction.

#### 8 **Mitigation Measure CMP: Compensatory Mitigation Plan**

9 The CMP (see Impact BIO-1 for a summary discussion of the CMP) would offset the loss of  
10 nesting and foraging habitat for white-tailed kite, osprey, Coopers hawk, and other nesting  
11 raptors by creating and protecting wetlands, riparian, and grasslands on Bouldin Island and the  
12 I-5 ponds (Appendix 3F, Section 3F.3.3), by creating or acquiring and permanently protecting  
13 tidal perennial aquatic habitat to ensure no significant loss of tidal perennial aquatic habitat  
14 functions and values (Appendix 3F, Section 3F.4.3 and Attachment 3F.1, Table 3F.1-2, CMP-1:  
15 *Tidal Perennial Aquatic Habitat*) and through the protection and management of agricultural  
16 foraging habitat for sandhill crane, Swainson's hawk, and tricolored blackbird (Appendix 3F,  
17 Attachment 3F.1, Table 3F.1-3, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19b: *Swainson's*  
18 *Hawk Foraging Habitat*, CMP-22b: *Tricolored Blackbird Foraging Habitat*). The CMP would also  
19 compensate for the temporal loss of suitable nest trees for these species (Attachment 3F.1, Table  
20 3F.1-3, CMP-19a: *Swainson's Hawk Nesting Habitat*).

#### 21 **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary,** 22 **to Prevent Light Spill from Truck Headlights toward Residences**

23 See description of Mitigation Measure AES-4c under Impact AES-4 in Chapter 18.

#### 24 **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for** 25 **Construction**

26 See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

#### 27 **Mitigation Measure NOI-1: Develop and Implement a Noise Control Plan**

28 See description of Mitigation Measure NOI-1 under Impact NOI-1 in Chapter 24.

#### 29 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 30 **Resources from Maintenance Activities**

31 See description of Mitigation Measure BIO-2b under Impact BIO-2.

#### 32 **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

33 See description of Mitigation Measure BIO-2c under Impact BIO-2.

1           **Mitigation Measure BIO-36a: Conduct Nesting Surveys for Special-Status and Non-Special-**  
2           **Status Birds and Raptors and Implement Protective Measures to Avoid Disturbance of**  
3           **Nesting Birds and Raptors**

4           ***All Project Alternatives***

5           To reduce impacts on nesting birds, DWR will implement the measures listed below prior to  
6           construction activities.

- 7           1. Timing Restrictions. To the maximum extent feasible, construction activities, vegetation  
8           removal, and trimming will be scheduled during the nonbreeding season of birds  
9           (September 1 through January 31) to avoid impacts on nesting birds if nesting birds are  
10          present. If construction activities, vegetation removal, and trimming cannot be conducted in  
11          accordance with this timeframe, surveys for nesting birds and additional protective  
12          measures will be implemented as described below.
- 13          2. Preconstruction Surveys. A qualified wildlife biologist with knowledge of the relevant  
14          species will conduct nesting surveys before the start of construction. A minimum of three  
15          separate surveys will be conducted within 30 days prior to construction, with the last  
16          survey within 3 days prior to construction. Surveys will be conducted within the project  
17          construction and staging areas and all suitable nesting habitat (e.g., trees, shrubs, emergent  
18          wetland, grasslands ruderal areas, cultivated lands, human-made structures) within 500 feet  
19          of the project construction and staging areas (or an alternative survey distance if described  
20          within species-specific USFWS or CDFW protocols or species-specific mitigation measures  
21          within this document) to locate any active nest protected by the Migratory Bird Treaty Act.  
22          If no active nests are detected during these surveys, no additional measures are required if  
23          construction begins within 3 calendar days. An additional survey will be conducted after any  
24          construction breaks of 3 calendar days or more. Surveys for nesting bank swallows will be  
25          conducted in RTM areas that have been present for at least 1 year, allowing the substrate to  
26          stabilize. Surveys of RTM will be conducted prior to RTM removal, during the bank swallow  
27          nesting season (April 1 through August 31).
- 28          3. No-Disturbance Buffer. If active nests are found in the survey area, no-disturbance buffers  
29          will be established around the nest sites to avoid disturbance or destruction of the nest site  
30          until the end of the breeding season (approximately September 1) or until a qualified  
31          wildlife biologist determines that the young have fledged and moved out of the work area  
32          (this date varies by species). Buffer distances vary by species and conservation status (e.g.,  
33          listed species and fully protected species may warrant larger buffers than non-special-  
34          status species) but typically, these buffer distances are between 300 feet and 650 feet for  
35          raptors and between 50 feet and 250 feet for other nesting birds. The extent of the buffers  
36          will be determined by the qualified wildlife biologist(s) and will be established by taking  
37          into consideration they type and extent of the proposed activity occurring near the nest, the  
38          duration and timing of the activity, the line of sight between the nest and the disturbance,  
39          the sensitivity and the habituation of the birds and raptors to existing conditions, and the  
40          dissimilarity of the proposed activity to ambient levels of noise and other disturbances. The  
41          qualified wildlife biologist(s) will mark the extent and locations of non-disturbance buffers  
42          on maps to present to construction personnel at morning tailboards or will use flagging,  
43          fencing, or other suitable physical markers, depending on the species of birds, the size of the  
44          buffers, and the construction activities to be conducted in the work area.

- 1 4. Nest Monitoring. The qualified wildlife biologist(s) will monitor construction activities in the  
2 vicinity of the nests to ensure that construction activities do not affect nest success. Reduced  
3 buffers (described above) may be allowed if a full-time qualified biologist is present to  
4 monitor the nest. Active nests will be monitored to track progress of nesting activities until  
5 the biologist determines that the young have fledged and are capable of independent  
6 survival or the nest site is no longer active.
- 7 5. Authority of Qualified Wildlife Biologist(s). If, during construction, the qualified wildlife  
8 biologist(s) determines that a nesting bird is disturbed by construction activities to the  
9 point where continued activities could lead to nest failure, the qualified wildlife biologist(s)  
10 will have the authority to immediately stop work. The qualified wildlife biologist(s) will  
11 determine additional if protective measures (including increasing the non-disturbance  
12 buffer distance) need to be implemented and will continue monitoring the nest until the  
13 qualified biologist(s) determine that bird behavior has normalized.

14 **Mitigation Measure BIO-36b: Conduct Preconstruction Surveys and Implement Protective**  
15 **Measures to Avoid Disturbance of White-Tailed Kite**

16 ***All Project Alternatives***

17 The following measures will be required for activities occurring in suitable white-tailed kite  
18 habitat.

- 19 1. Preconstruction Surveys. Preconstruction surveys will be conducted by a qualified  
20 biologist(s) to identify the presence of potential white-tailed hawk nest trees on within 0.25  
21 mile of project sites, where accessible. Transportation routes along public roads (roads  
22 leading to and from work areas) are considered disturbed, and no surveys or monitoring are  
23 required for nests along those roadways unless they are within 0.25 mile of work areas.  
24 Surveys for nesting white-tailed kites will be conducted, following a protocol approved by  
25 CDFW, within 30 days prior to construction to ensure nesting activity is documented prior  
26 to the onset of construction activity during the nesting season. White-tailed kite nest in the  
27 study area between approximately March 15 and September 15. While many nest sites are  
28 traditionally used for multiple years, new nest sites can be established in any year.  
29 Therefore, construction activity that is planned after March 15 of any year will require  
30 surveys during the year of the construction. If construction is planned before March 15 of  
31 any year, surveys will be conducted the year immediately prior to the year of construction.  
32 DWR will provide survey results to CDFW by phone or email no less than 5 days prior to  
33 commencement of construction activities. The qualified biologist(s) will conduct a second  
34 survey of potential nesting trees and active nests and monitor white-tailed kite nests no  
35 more than 72 hours prior to construction. If no nesting activity is found, then construction  
36 can proceed with no restrictions if construction begins within 3 calendar days. An additional  
37 survey will be conducted after any construction breaks of 3 calendar days or more.
- 38 2. Timing Restrictions. Where the construction site occurs within 0.25 mile of a white-tailed  
39 kite nest, DWR will limit construction activities to outside the white-tailed kite breeding  
40 season (March 15 through September 15), to the extent feasible. Where construction  
41 activities within 0.25 mile of an active nest cannot feasibly be avoided during the breeding  
42 season, DWR will initiate construction prior to egg laying to the greatest extent feasible. This  
43 will allow time for white-tailed kites to acclimate to disturbance before eggs are laid. If eggs  
44 or young are present in the nest, work will not be permitted to occur until the qualified

- 1 biologist(s) determines that white-tailed kites have acclimated to disturbance and exhibit  
2 normal nesting behavior.
- 3 3. No-Disturbance Buffer. Where construction activities must occur within 0.25 mile of an  
4 occupied white-tailed kite nest, DWR will establish a 650-foot-radius (198 meters) non-  
5 disturbance buffer (buffer) around each white-tailed kite nest tree and the buffer will  
6 remain in place until the end of the breeding season or until the last chick has left the nest.  
7 DWR will clearly delineate the buffer with fencing or other conspicuous marking. The  
8 qualified biologist(s) will monitor occupied nest trees to track progress of nesting activities  
9 (see *White-tailed Kite Nest Monitoring* below). DWR will not conduct any construction  
10 activities within the buffer while a nest site is occupied by white-tailed kite during the  
11 breeding season. The buffer size may be modified based on the field examination and  
12 determination by the qualified biologist(s) of conditions that may minimize disturbance  
13 effects, including line of sight, topography, land use, type of disturbance, existing ambient  
14 noise and disturbance levels, and other relevant factors, as authorized by CDFW. Entry into  
15 the buffer will be granted when the qualified biologist(s) determines that the young have  
16 fledged and are capable of independent survival, or the nest has failed, and the nest site is no  
17 longer active.
- 18 4. White-Tailed Kite Nest Monitoring. Where construction activities must occur within 0.25  
19 mile of an occupied white-tailed kite nest tree, DWR will implement the following  
20 monitoring plan.
- 21 a. Five days and three days prior to the initiation of construction at any site where a nest is  
22 within 650 feet of construction, the qualified biologist(s) will observe the subject nest(s)  
23 for at least 1 hour or until normal nesting behavior can be determined. The qualified  
24 biologist(s) will document nesting status and behaviors to compare to nesting status  
25 and behaviors after construction begins. The results of preconstruction monitoring will  
26 be reported to CDFW within 24 hours of each survey.
- 27 b. Where an occupied white-tailed kite nest tree occurs less than 325 feet (99 meters)  
28 from construction, the qualified biologist(s) will observe the nest for at least 4 hours per  
29 day during construction to ensure the white-tailed kites are engaged in normal nesting  
30 behavior.
- 31 c. Where an occupied white-tailed kite nest tree occurs between 325 to 650 feet (99 to  
32 198 meters) from construction, the qualified biologist(s) will observe the nest for at  
33 least 2 hours per day during construction to ensure the white-tailed kites are engaged in  
34 normal nesting behavior.
- 35 d. Where an occupied white-tailed kite nest tree occurs between 650 to 1,300 feet (198 to  
36 396 meters) from construction, the qualified biologist(s) will observe the nest once a  
37 day during construction to ensure the white-tailed kites are engaged in normal nesting  
38 behavior and to check the status of the nest.
- 39 5. Disturbance of Occupied Nest Tree. DWR will prohibit physical contact with an active nest  
40 tree from the time of egg laying to fledging, unless approved by CDFW. All workers within  
41 650 feet will be out of the line of sight of the occupied white-tailed kite nest tree during  
42 breaks or will take breaks more than 650 feet from an occupied nest tree.
- 43 6. Authority of Qualified Biologist(s). The project will be implemented in a manner that will  
44 not result in take of white-tailed kite, as defined by Section 86 of the California Fish and



- 1 Game Code. If during construction, the qualified biologist(s) determines that a nesting  
2 white-tailed kite within 0.25 mile of construction is disturbed by construction activities to  
3 the point where nest abandonment is likely, the qualified biologist(s) will have the authority  
4 to immediately stop work and will immediately notify DWR. A designated representative  
5 from DWR will contact CDFW within 24 hours to determine additional protection measures  
6 to be implemented. The qualified biologist(s) will:
- 7 a. Stop construction until additional protective measures are implemented unless white-  
8 tailed kite behavior normalizes on its own. Potential nest abandonment and failure may  
9 be indicated if, in the qualified biologist(s)' professional judgment, the white-tailed kite  
10 exhibits distress and/or abnormal nesting behavior, such as swooping or stooping at  
11 construction equipment or personnel, excessive distress-call vocalization or agitated  
12 behavior directed personnel, failure to remain on nest, or failure to deliver prey items.
  - 13 b. Continue monitoring and ensure additional protective measures remain in place until  
14 the qualified biologist(s) determine(s) white-tailed kite behavior has normalized.
  - 15 c. Determine if additional protective measures are ineffective and stop construction until  
16 the additional protective measures are modified.
  - 17 d. Continue monitoring until determining that white-tailed kite behavior has normalized.
  - 18 e. The DWR representative or qualified biologist(s) will notify CDFW within 24 hours if  
19 nests or nestlings are abandoned and if the nestlings are still alive. The qualified  
20 biologist(s) will work with CDFW to determine appropriate actions.
- 21 7. Nest Tree Avoidance. DWR will avoid removal of known nest trees to the maximum extent  
22 feasible. If a known nest tree must be removed for construction activities, DWR will notify  
23 and obtain written approval from CDFW. The notification will include the location of the  
24 known nest tree, conditions to offset the loss of the nest tree, and the time of removal, which  
25 will generally be October 1 through February 1. DWR will not remove any occupied nest tree  
26 until the last young have left the nest, as verified by the qualified biologist(s). DWR will  
27 compensate for the temporal loss of known white-tailed kite nest trees using the protocol  
28 described for Swainson's Hawk in Appendix 3F, *Compensatory Mitigation* (Attachment 3F.1,  
29 Table 3F.1-3, CMP-19a: *Swainson's Hawk Nesting Habitat*).
- 30 8. Geotechnical Exploration. DWR will conduct geotechnical exploration outside of the  
31 breeding season, to the extent practicable. The qualified biologist(s) will delineate with  
32 flagging or other visible markers suitable breeding habitat within the geotechnical  
33 exploration site. DWR will restrict geotechnical exploration to areas outside of the  
34 delineated breeding habitat. If geotechnical exploration must occur during the breeding  
35 season, the qualified biologist(s) will survey the breeding habitat within 0.25 mile for  
36 nesting white-tailed kite. DWR will limit geotechnical exploration activities to least 0.25 mile  
37 away from any occupied nest tree, unless otherwise approved by CDFW.
- 38 9. Measures Specific to Transmission Line Construction. DWR will not use helicopters to string  
39 transmission lines or to conduct field investigations within 0.25 mile of an occupied nest  
40 tree. DWR will not remove or trim occupied nest trees for transmission line construction  
41 until after the breeding season has ended or the last young have left the nest. If removal or  
42 trimming of an occupied nest tree needs to occur for human or wildlife safety, DWR will  
43 conduct removal or trimming from October 1 to February 1, or with written approval and  
44 guidance from CDFW. DWR will avoid removal or trimming of known or suitable nest trees,

1 to the extent practicable, during transmission line stringing and reconductoring activities or  
2 during power and pole placement. Where practicable, DWR will place poles and lines  
3 outside of breeding habitat, as delineated by the qualified biologist(s). DWR will follow the  
4 *Nest Tree Avoidance* measures listed above when removal or trimming of known or suitable  
5 nest trees cannot be avoided.

## 6 ***Mitigation Impacts***

7 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
8 mitigation measure impacts. The analyses below consider the potential impacts associated with  
9 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
10 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
11 *Measures*.

### 12 *Compensatory Mitigation*

13 The creation and enhancement of wetlands as well as habitat for special-status species under the  
14 project's CMP would affect special-status and non-special-status raptors through the permanent  
15 and temporary loss of habitat (Appendix 13C) on Bouldin Island or at the I-5 ponds from vegetation  
16 removal and grading to create the appropriate topography and soil conditions to establish or restore  
17 habitats.

18 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
19 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
20 vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located, which could  
21 support suitable foraging habitat for Cooper's hawk, white-tailed kite and other nesting raptors and  
22 could result in disturbances to these species including the disruption of foraging behaviors. Site-  
23 specific analyses are not provided because locations of potential non-bank sites are not currently  
24 known.

25 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
26 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
27 management of agricultural areas but may also include natural communities in the study area  
28 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
29 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
30 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
31 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could potentially contain habitat for  
32 osprey, Cooper's hawk, white-tailed kite, and other nesting raptors and management activities could  
33 affect this habitat and result in the disruption of normal behaviors, injury, and mortality. Site-  
34 specific analyses are not provided because locations of potential protection instruments are not  
35 currently known.

36 The CMP and site-specific permitting approvals would account for any losses of nesting habitat from  
37 habitat creation by adjusting the overall commitment of riparian and wetland creation and  
38 grassland and cultivated lands protection (Appendix 3F, Section 3F.1, Section 3F.2.4, and  
39 Attachment 3F.1, Table 3F.1-3, CMP-0: *General Design Guidelines*) and therefore reduce any habitat  
40 losses associated with the CMP to less than significant. The creation and enhancement activities  
41 would also have the potential for injury, mortality, and the disruption of normal behaviors of  
42 individuals if restoration activities occur during the breeding season (February 1 through August  
43 31), as described above under construction-related effects. Environmental Commitments EC-1:

1        *Conduct Worker Awareness Training; EC-2: Develop and Implement Hazardous Materials Management*  
2        *Plans; EC-3: Develop and Implement Spill Prevention, Containment, and Countermeasure Plans; EC-11:*  
3        *Fugitive Dust Control; and EC-14: Construction Best Management Practices for Biological Resources*  
4        *(Appendix 3B) and Mitigation Measures BIO-36a: Conduct Nesting Surveys for Special-Status and*  
5        *Non-Special-Status Birds and Raptors and Implement Protective Measures to Avoid Disturbance of*  
6        *Nesting Birds and Raptors; and BIO-36b: Conduct Preconstruction Surveys and Implement Protective*  
7        *Measures to Avoid Disturbance of White-Tailed Kite* would minimize disturbance of habitat and avoid  
8        take of white-tailed kite, as defined by Section 86 of Fish and Game Code and would reduce the  
9        potential for injury, mortality, or the disruption of normal behaviors and disturbances to habitat for  
10       osprey, Cooper's hawk, and other nesting raptors to less than significant. These impacts would be  
11       less than significant with mitigation because the aforementioned measures would (1) train  
12       construction staff on protecting nesting raptors, the requirements for avoiding impacts, and the  
13       ramifications for not following these measures; (2) minimize dust; (3) implement spill prevention  
14       and containment plans that would avoid material spills that could affect habitat; (4) prior to and  
15       during implementing restoration and enhancement ground disturbance, establish protective buffers  
16       around occupied nest sites; and (5) have a biological monitor present that would ensure that non-  
17       disturbance buffers are intact and all protective measures are being implemented where applicable.

18       Tidal restoration and creation and enhancement of wetlands at Bouldin Island and the I-5 ponds  
19       under the CMP have the potential to increase methylmercury bioavailability, as newly wetted areas  
20       produce the biogeochemical conditions to methylate mercury existing in Delta soils. There is  
21       potential for increased exposure of foodwebs to methylmercury in these localized areas, with the  
22       level of exposure dependent on the amounts of mercury available in the soils and site-specific  
23       biogeochemical conditions. Increased methylmercury associated with wetland creation and  
24       enhancement may affect osprey, white-tailed kite, Cooper's hawk, and other nesting raptors via  
25       uptake through consumption of prey. Because Bouldin Island and the I-5 ponds sites consist of  
26       existing managed and agricultural wetlands and ponds, wetland creation and enhancement are not  
27       expected to increase mercury methylation, relative to existing conditions. Monitoring and adaptive  
28       management plans as described in the CMP (Appendix 3F, Section 3F.7.2) would include mercury  
29       monitoring and adaptive management at Bouldin Island and the I-5 ponds to prevent increased  
30       mercury methylation, relative to existing conditions. Mitigation Measure WQ-6: *Develop and*  
31       *Implement a Mercury Management and Monitoring Plan*, which contains measures to assess the  
32       amount of mercury at tidal restoration sites before project development, followed by appropriate  
33       design, monitoring, and adaptation management, would minimize the potential for any effects of  
34       increased methylmercury exposure in adjacent aquatic and terrestrial habitats due to tidal  
35       restoration. Therefore, the CMP would not be expected to have a significant adverse impact on  
36       osprey, white-tailed kite, Cooper's hawk, and other nesting raptors.

37       Herbicides would be applied at CMP wetland creation and enhancement sites to remove nonnative  
38       vegetation for site preparation and to support establishment of new plantings. Natural habitats  
39       contribute fewer pesticides to receiving waters than agricultural areas where pesticides are applied.  
40       Any newly created wetlands or enhanced natural habitat could also filter stormwater to remove  
41       solids and either improve or have no effect on pesticide concentrations in discharges to receiving  
42       waters, relative to existing conditions. As such, wetland creation and enhancement areas are  
43       expected to somewhat reduce, rather than increase, runoff of pesticides into adjacent waterbodies.  
44       Environmental Commitment EC-14: *Construction Best Management Practices for Biological Resources*  
45       (Appendix 3B) would ensure that herbicides would be applied in such a manner as to prevent

1 primary or secondary poisoning of osprey, white-tailed kite, Cooper's hawk, and other nesting  
2 raptors.

3 Habitat creation and enhancement under the CMP has the potential to result in conditions that  
4 promote CHABs, which could result in impacts on osprey, white-tailed kite, Cooper's hawk, and  
5 other nesting raptors foraging near created and enhanced wetland habitats. High levels of  
6 microcystins in tissues and microcystin poisoning have been documented in other piscivorous bird  
7 species using other aquatic habitats (Chen et al. 2009:3317) and in terrestrial foodwebs (Moy et al.  
8 2016:A) and could affect osprey, white-tailed kite, Cooper's hawk, and other nesting raptors if their  
9 prey forage in areas with conditions that promote CHABs. Monitoring and adaptive management  
10 plans as described in the CMP (Appendix 3F, Section 3F.7.2) would include CHAB monitoring and  
11 adaptive management at Bouldin Island and the I-5 ponds to prevent increased CHAB formation,  
12 relative to existing conditions. As discussed in Chapter 9, tidal habitat creation is not expected to  
13 cause substantial additional *Microcystis* production. Therefore, the CMP would not result in  
14 increased CHAB formation that could cause substantial adverse impacts on osprey, white-tailed kite,  
15 Cooper's hawk, and other nesting raptors, relative to existing conditions.

16 Selenium concentrations increase with trophic level and birds that consume prey with high levels of  
17 selenium have a higher risk of selenium toxicity (Ackerman and Eagles-Smith 2009:2139);  
18 therefore, osprey, white-tailed kite, Cooper's hawk, and other nesting raptors that forage on fish and  
19 terrestrial vertebrates may be at elevated risk of selenium toxicity. Wetland creation and  
20 enhancement may result in mobilization of selenium in Delta sediments, which could increase the  
21 risk of selenium toxicity to osprey, white-tailed kite, Cooper's hawk, and other nesting raptors. It is  
22 difficult to determine whether the effects of potential increases in selenium bioavailability  
23 associated with restoration activities under the CMP would lead to adverse effects on these species.  
24 Modeled concentrations in piscivorous bird eggs under existing conditions in the Delta were below  
25 levels of concern for other bird species (Appendix 9J), and existing selenium concentrations in the  
26 Sacramento River watershed are low (Central Valley Regional Water Quality Control Board  
27 1988:14). Analysis included in Chapter 9 for Impact WQ-10: *Effects on Selenium Resulting from*  
28 *Facility Operations* found that compensatory mitigation would not result in a measurable increase in  
29 selenium concentrations or selenium bioavailability. Therefore, potential increased exposure to  
30 selenium resulting from restoration would not be expected to adversely affect osprey, white-tailed  
31 kite, Cooper's hawk, and other nesting raptors. The impact on osprey, white-tailed kite, Cooper's  
32 hawk, and other nesting raptors from the project with the CMP would be less than significant with  
33 mitigation.

#### 34 Other Mitigation Measures

35 Some mitigation measures would involve ground disturbance, the use of heavy equipment, pile  
36 driving, or pesticides that would have the potential to expose osprey, white-tailed kite, and Cooper's  
37 hawk to excessive noise, visual disturbance, dust, and hazardous materials that could cause loss of  
38 modeled habitat, disruption of normal behaviors, and injury or mortality. The mitigation measures  
39 with potential to result in impacts on osprey, white-tailed kite, and Cooper's hawk are similar to  
40 those discussed under Impact BIO-31: *Impacts of the Project on Western Yellow-Billed Cuckoo*.  
41 Impacts on osprey, white-tailed kite, and Cooper's hawk resulting from mitigation measures would  
42 be similar to construction effects of the project alternatives in certain construction areas and would  
43 contribute to osprey, white-tailed kite, and Cooper's hawk impacts of the project alternatives.

1 The impacts of habitat loss, noise, visual disturbance, and exposure to dust or hazardous materials  
 2 on osprey, white-tailed kite, and Cooper's hawk would be reduced through the CMP, environmental  
 3 commitments, and Mitigation Measure NOI-1: *Develop and Implement a Noise Control Plan* as  
 4 detailed under Impact BIO-31: *Impacts of the Project on Western Yellow-Billed Cuckoo*. In addition,  
 5 Mitigation Measures BIO-36a: *Conduct Nesting Surveys for Special-Status and Non-Special-Status*  
 6 *Birds and Raptors and Implement Protective Measures to Avoid Disturbance of Nesting Birds and*  
 7 *Raptors*; and BIO-36b: *Conduct Preconstruction Surveys and Implement Protective Measures to Avoid*  
 8 *Disturbance of White-Tailed Kite* would require species-specific measures to reduce these impacts.  
 9 Therefore, impacts on osprey, white-tailed kite, and Cooper's hawk from implementation of other  
 10 mitigation measures would be reduced to less than significant.

11 Overall, the impacts on osprey, white-tailed kite, and Cooper's hawk from construction of  
 12 compensatory mitigation and implementation of other mitigation measures, combined with project  
 13 alternatives, would not change the impact conclusion of less than significant with mitigation.

#### 14 **Impact BIO-37: Impacts of the Project on Golden Eagle and Ferruginous Hawk**

15 The methods for the analysis of effects on golden eagle and ferruginous hawk appear in Section  
 16 13.3.1.1, and information on the species' life histories and habitat suitability models are presented in  
 17 the following species accounts in Appendix 13B: Section 13B.69, *Golden Eagle*, and Section 13B.73,  
 18 *Ferruginous Hawk*.

#### 19 ***All Project Alternatives***

##### 20 *Construction*

21 The construction of all project alternatives would affect modeled foraging habitat for golden eagle  
 22 and ferruginous hawk. Moreover, the same habitat is also suitable to support other wintering  
 23 raptors (e.g., red-tailed hawk, merlin). Effects on golden eagle and ferruginous hawk would include  
 24 the permanent and temporary loss of habitat and the potential for injury, mortality, and the  
 25 disruption of normal behaviors. The loss of foraging habitat for golden eagle, ferruginous hawk, and  
 26 other wintering raptors would primarily occur as a result of the construction of the Southern  
 27 Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and the placement of RTM (all alternatives;  
 28 Appendix 13C). Habitat loss from the construction of the levee improvements and new roads or road  
 29 improvements would remove relatively narrow slivers of grassland and cultivated lands that are  
 30 less likely to be used by these species. Acres of permanent and temporary impacts on modeled  
 31 habitat for golden eagle, ferruginous hawk, and other wintering raptors are shown in Table 13-78.  
 32 Environmental Commitment EC-14: *Construction Best Management Practices for Special-Status*  
 33 *Species* would ensure that temporarily disturbed areas are restored (Appendix 3B).

34 **Table 13-78. Impacts on Modeled Foraging Habitat for Golden Eagle, Ferruginous Hawk, and Other**  
 35 **Wintering Raptors by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	2,311.30	258.57	2,569.87
2a	2,503.07	286.79	2,789.86
2b	2,074.76	278.45	2,353.21
2c	2,196.98	285.27	2,482.25
3	2,114.40	236.80	2,351.20

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
4a	2,374.06	239.75	2,613.81
4b	1,839.53	231.33	2,070.86
4c	2,000.18	238.16	2,238.34
5	1,381.89	115.31	1,497.20

<sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see discussion in Section 13.3.1.2.

Construction activities are not expected to injure or kill foraging raptors because they are highly mobile and would avoid direct injury or mortality from slow-moving or stationary construction equipment. Construction-related noise and night lighting may have the potential to affect the behavior of golden eagle or ferruginous hawk and cause them to avoid areas of disturbance. All lights used during nighttime construction would be downcast, cut-off type fixtures with non-glare finishes, natural light qualities, and minimum intensity. Construction-related lighting would be shielded and oriented in such a manner so as not to subject the immediate surroundings to extremes in the levels of light, however, these types of light generate an ambient nighttime luminescence that is visible from a distance. Construction activities could result in dust and the discharge of construction-related fluids, which could also affect golden eagle and ferruginous hawk individuals and their habitat if present in or adjacent to work areas. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training construction staff on protecting these species, reporting requirements, and the ramifications for not following these measures; (2) implementing spill prevention and containment plans that would avoid material spills that could affect suitable habitat; and (3) having a biological monitor present that would ensure that non-disturbance buffers are intact and all protective measures are being implemented, where applicable.

Ferruginous hawks do not breed in the study area (Polite and Pratt 1999:2) but there are records of golden eagle territories and nests in the southwestern portion of the study area (Wiens pers. comm.). Removal of nests during the breeding season and construction disturbance within 2 miles of occupied golden eagle nests (U.S. Fish and Wildlife Service 2020b:1), could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment.

Field investigations would be conducted prior to and during construction under all project alternatives to more specifically identify appropriate construction methods and design criteria addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities, and address the establishment of geological and groundwater monitoring programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a variety of ground-disturbing activities that would vary in duration from several hours to approximately 6 weeks (Section 3.15; Delta Conveyance Design and Construction Authority 2022a, 2022b) and could result in impacts on foraging habitat and the disruption of normal behaviors of for golden eagle and ferruginous hawk and the potential for injury or mortality of golden eagle if nests are present within the vicinity of work areas. Geotechnical investigations that would occur in the West Tracy Fault Study area, and over the tunnel alignment footprints which include test trenches, CPTs, soil borings, and geophysical arrays, would result in temporary impacts on modeled habitat (Appendix 13C). The Bethany Fault Study geotechnical investigations

1 (Alternative 5) would be completed in a single day and would involve placing approximately 20 ERT  
2 probes 0.5 inch in diameter. The study would be conducted entirely on foot, perpendicular to the  
3 tunneled portion of the Bethany Reservoir Aqueduct (Delta Conveyance Design and Construction  
4 Authority 2022a, 2022b). The Bethany Fault Study could result in minor disruption of normal  
5 behaviors, but because of its small footprint and the short (1-day) duration of the disturbance,  
6 impacts on modeled habitat are not quantified and are considered negligible. The following field  
7 investigations would be conducted within proposed surface construction footprints of project  
8 facilities (including portions of tunnel alignments) and would temporarily affect habitat: test  
9 trenches, CPTs, soil borings, ERT, groundwater testing and monitoring, monument installation, pilot  
10 studies for settlement, agronomic testing, and utility potholing. These temporary impacts are not  
11 characterized as an additional loss of habitat because impacts for these locations have already been  
12 quantified within the construction-related footprints but could still result in the potential disruption  
13 of normal behaviors of golden eagle and ferruginous hawk if present in the vicinity, as discussed  
14 above for conveyance facility construction. Noise and visual disturbances from helicopter surveys to  
15 identify buried groundwater and natural gas wells throughout the project area may cause some  
16 disturbance to foraging golden eagles and ferruginous hawks and could result in the incidental loss  
17 of fertile eggs or nestlings, or otherwise lead to nest abandonment if surveys are conducted in the  
18 vicinity of occupied nests. Environmental Commitments EC-1: *Conduct Worker Awareness Training*;  
19 EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement*  
20 *Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management*  
21 *Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1)  
22 training construction staff on protecting these species, reporting requirements, and the  
23 ramifications for not following these measures; (2) implementing spill prevention and containment  
24 plans that would avoid material spills that could affect suitable habitat; and (3) having a biological  
25 monitor present that would ensure that non-disturbance buffers are intact and all protective  
26 measures are being implemented, where applicable.

### 27 Operations

28 The operation of project facilities would not require ground disturbance or result in additional  
29 habitat loss, but project operations would generate small levels of noise, have permanent light  
30 sources, and require the periodic presence of staff and vehicle traffic. Noise from the operation of  
31 the water conveyance facilities would not be discernably higher than existing conditions (Chapter  
32 24, Section 24.4.3.2). If permanent facility lighting associated with project facilities under all  
33 alternatives extends into golden eagle nesting territories, it could affect the behavior of individuals,  
34 as described above under construction-related effects; however, as stated in Chapter 3, Section  
35 3.4.12, permanent lighting at project facilities would be motion activated, downcast, cut-off type  
36 fixtures with non-glare finishes, and therefore permanent facilities would remain dark the majority  
37 of the time at night, which would minimize the potential for this impact.

38 Power for construction and operation of the conveyance facilities has been designed to use existing  
39 power lines and underground conduit to the extent feasible under all project alternatives. Most new  
40 project lines would be placed on existing poles and towers and therefore would not substantially  
41 alter the existing landscape. New aboveground high-voltage transmission and SCADA lines would be  
42 constructed to power the Southern Complex under Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c and  
43 the Bethany Complex under Alternative 5 (Chapter 3, Figure 3-13 and Figure 3-14). Eagles, like  
44 other raptors, are categorized as thermal soarers with low wing loading and low wing aspect ratio  
45 (Bevanger 1998:69) and raptors, including eagles and ferruginous hawks are less susceptible to

1 collision than other avian species (Avian Power Line Interaction Committee 2018:8). As aerial  
2 hunters, raptors such as golden eagles and ferruginous hawks have good vision and are highly  
3 maneuverable, and their depth perception used to pursue prey also makes them less vulnerable to  
4 power line collisions (Avian Power Line Interaction Committee 2018:8; Slater et al. 2020:198). In  
5 addition, large transmission lines, such as the proposed project lines pose a minimal risk of collision  
6 to golden eagles and ferruginous hawk, because the lines are large and relatively visible to the  
7 species (Avian Power Line Interaction Committee 2018:5). Most electrocutions of eagles and other  
8 raptors, including ferruginous hawks, occur at low voltage distribution lines because of the small  
9 spacing between uninsulated energized components (Slater et al. 2020:198; Mojica et al. 2018:3;  
10 Avian Power Line Interaction Committee 2018:5). Large transmission lines such as the proposed  
11 project lines pose essentially no electrocution risk because of the inherently large spacing required  
12 between the electrified components (Avian Power Line Interaction Committee 2018:5). Golden  
13 eagles have been recorded nesting in similar transmission towers over multiple years in the vicinity  
14 of the Bethany Reservoir (Wiens pers. comm.).

### 15 Maintenance

16 The maintenance of aboveground water conveyance facilities for all project alternatives would  
17 result in periodic disturbances within and adjacent to ferruginous hawk and golden eagle foraging  
18 habitat and potential golden eagle nesting territories. Maintenance activities across all facilities that  
19 could affect ferruginous hawk and golden eagle (all alternatives) include repaving of access roads  
20 every 15 years, semiannual general and ground maintenance (e.g., mowing, vegetation trimming,  
21 herbicide application), and daily or weekly inspections by vehicle. Maintenance activities at launch,  
22 reception, and maintenance shafts along the central alignment (Alternatives 1, 2a, 2b, and 2c),  
23 eastern alignment (Alternatives 3, 4a, 4b, and 4c), and Bethany Reservoir alignment alternative  
24 (Alternative 5) would include similar semiannual general and ground maintenance in addition to  
25 daily inspections by vehicle. Maintenance at the Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a,  
26 4b, and 4c) would also include annual embankment repair and quarterly animal burrow filling.  
27 These maintenance activities could result in disturbances to ferruginous hawk (wintering season)  
28 and golden eagle (breeding or wintering season). Maintenance activities would generally be  
29 conducted during the day, except for emergency maintenance, and would therefore not require  
30 additional lighting. Noise effects from maintenance activities could negatively affect ferruginous  
31 hawk and golden eagle, as described above under construction-related effects.

### 32 **CEQA Conclusion—All Project Alternatives**

33 Construction, operations, and maintenance of the water conveyance facilities under all project  
34 alternatives would result in impacts on golden eagle and ferruginous hawk through the permanent  
35 and temporary loss of modeled habitat and the potential for injury, mortality, and the disruption of  
36 normal behaviors. The temporary impacts on habitat and potential impacts of injury, mortality, or  
37 disruption of normal behaviors from project construction, operations, and maintenance activities  
38 would be reduced by Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2:  
39 *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
40 *Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14:  
41 *Construction Best Management Practices for Special-Status Species* (Appendix 3B); however, even  
42 with these commitments, the impacts of the project alternatives on golden eagle (nesting and  
43 wintering), ferruginous hawk, and other wintering raptors would be significant. The CMP would be  
44 required to offset the loss of habitat by creating and protecting grassland habitat (Appendix 3F,



1 Section 3F.3.3) on Bouldin Island and the I-5 ponds and from the protection of agricultural foraging  
2 habitat for sandhill crane, Swainson's hawk, and tricolored blackbird (Appendix 3F, Attachment  
3 3F.1, Table 3F.1-3, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19b: *Swainson's Hawk Foraging*  
4 *Habitat*, and CMP-22b: *Tricolored Blackbird Foraging Habitat*), which would mitigate the loss of  
5 golden eagle and ferruginous hawk winter foraging habitat to a less-than-significant level. The  
6 purchasing of conservation credits for California red-legged frog and California tiger salamander at a  
7 USFWS- and CDFW-approved mitigation bank or other approved conservation areas (Appendix 3F,  
8 Section 3F.3.3.3 and Attachment 3F.1, Table 3F.1-3, CMP-13: *California Tiger Salamander Habitat*  
9 and CMP-14: *California Red-Legged Frog Habitat*) would contain upland grasslands also potentially  
10 suitable for golden eagle and ferruginous hawk.

11 Mitigation Measures AES-4b: *Minimize Fugitive Light from Portable Sources Used for Construction*;  
12 AES-4c: *Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light Spill from Truck*  
13 *Headlights toward Residences* (Chapter 18); NOI-1: *Develop and Implement a Noise Control Plan*  
14 (Chapter 24); BIO-2b: *Avoid and Minimize Impacts on Biological Resources from Maintenance*  
15 *Activities*; BIO-2c: *Electrical Power Line Support Placement*; and BIO-37: *Conduct Surveys for Golden*  
16 *Eagle and Avoid Disturbance of Occupied Nests* would be required to avoid and minimize disturbance  
17 of habitat and avoid take of golden eagle, as defined by Section 86 of Fish and Game Code and would  
18 avoid and minimize the potential for injury, mortality, or the disruption of normal behaviors and  
19 disturbances to habitat for ferruginous hawk. The impacts on ferruginous hawk and golden eagle  
20 from the project alternatives would be less than significant with mitigation because the  
21 aforementioned measures would replace lost habitat, reduce direct effects on the species, including  
22 habitat, noise, and visual disturbances, by providing environmental awareness training to  
23 construction personnel, by implementing protective measures during maintenance activities, and  
24 avoidance measures to avoid take of golden eagles, as defined by Section 86 of the California Fish  
25 and Game Code during construction.

#### 26 **Mitigation Measure CMP: Compensatory Mitigation Plan**

27 The CMP (see Impact BIO-1 for a summary discussion of the CMP) would offset the loss of  
28 golden eagle and ferruginous hawk habitat by creating and protecting grasslands on Bouldin  
29 Island and the I-5 ponds (Appendix 3F, Section 3F.3.3.2). The protection and management of  
30 agricultural foraging habitat for sandhill crane, Swainson's hawk, and tricolored blackbird may  
31 also provide suitable habitat for these species (Appendix 3F, Attachment 3F.1, Table 3F.1-3,  
32 CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-  
33 22b: *Tricolored Blackbird Foraging Habitat*). The purchasing of conservation credits for  
34 California red-legged frog and California tiger salamander at a USFWS- and CDFW-approved  
35 mitigation bank or other approved conservation areas (Appendix 3F, Section 3F.3.3.3 and  
36 Attachment 3F.1, Table 3F.1-3, CMP-13: *California Tiger Salamander Habitat*, and CMP-14:  
37 *California Red-Legged Frog Habitat*) would contain upland grasslands also potentially suitable  
38 for golden eagle and ferruginous hawk.

#### 39 **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for** 40 **Construction**

41 See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

1           **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary,**  
2           **to Prevent Light Spill from Truck Headlights toward Residences**

3           See description of Mitigation Measure AES-4c under Impact AES-4 in Chapter 18.

4           **Mitigation Measure NOI-1: Develop and Implement a Noise Control Plan**

5           See description of Mitigation Measure NOI-1 under Impact NOI-1 in Chapter 24.

6           **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
7           **Resources from Maintenance Activities**

8           See description of Mitigation Measure BIO-2b under Impact BIO-2.

9           **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

10          See description of Mitigation Measure BIO-2c under Impact BIO-2.

11          **Mitigation Measure BIO-37: Conduct Surveys for Golden Eagle and Avoid Disturbance of**  
12          **Occupied Nests**

13          ***All Project Alternatives***

14          The following measures will be required to avoid disturbance of occupied golden eagle nests.

- 15          1. Prior to the start of construction, DWR will require qualified wildlife biologists (experienced  
16             with raptor identification and behaviors) to conduct focused surveys for golden eagle nests  
17             in suitable habitat within a 2-mile radius of the construction footprint. Survey methods and  
18             survey area boundaries will be determined based on coordination with USFWS and CDFW  
19             and all survey results will be submitted to USFWS and CDFW. In addition, prior to  
20             conducting surveys, any known breeding area records will be reviewed, and a map of  
21             potential nest sites will be created using GIS mapping of suitable nesting habitat.
- 22          2. If an occupied golden eagle nest is identified in the survey area, a no-disturbance buffer will  
23             be established around the nest site to avoid disturbance or destruction of the site, consistent  
24             with the *USFWS Recommended Buffer Zones for Ground-based Human Activities around*  
25             *Nesting Sites of Golden Eagles in California and Nevada* (U.S. Fish and Wildlife Service  
26             2020b:1), or more recent USFWS-approved guidance, if it becomes available. If active eagle  
27             nests are identified and avoidance guidelines cannot be feasibly implemented, then DWR  
28             will coordinate with the USFWS and CDFW to determine how to implement the project and  
29             avoid take.

30          ***Mitigation Impacts***

31          As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
32          mitigation measure impacts. The analyses below consider the potential impacts associated with  
33          implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
34          Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
35          *Measures*.

1        Compensatory Mitigation

2        The creation and enhancement of wetlands as well as habitat for special-status species under the  
3        project's CMP would affect golden eagle and ferruginous hawk foraging habitat through the  
4        permanent and temporary loss of habitat (Appendix 13C) from vegetation removal and grading to  
5        create the appropriate topography and soil conditions to establish or restore habitats.

6        In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
7        enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
8        vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located, which could  
9        support suitable foraging habitat for golden eagle and ferruginous hawk and could result in  
10        disturbances to these species including the disruption of foraging behaviors if the birds were  
11        present in the area. Site-specific analyses are not provided because locations of potential non-bank  
12        sites are not currently known.

13        Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
14        crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
15        management of agricultural areas but may also include natural communities in the study area  
16        (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
17        *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
18        CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
19        CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could potentially contain habitat for  
20        golden eagle and ferruginous hawk and management activities could affect this habitat and result in  
21        the disruption of foraging behaviors if the birds were present in the area. Site-specific analyses are  
22        not provided because locations of potential protection instruments are not currently known.

23        The CMP and site-specific permitting approvals would account for any losses of nesting habitat from  
24        habitat creation by adjusting the overall commitment of riparian and wetland creation and  
25        grassland and cultivated lands protection (Appendix 3F, Section 3F.1, Section 3F.2.4, and  
26        Attachment 3F.1, Table 3F.1-3, CMP-0: *General Design Guidelines*) and therefore reduce any habitat  
27        losses associated with the CMP to less than significant. The creation and enhancement activities are  
28        not expected to injure or kill golden eagle individuals because the potential for birds to occur in  
29        restoration areas is very low. In addition, if a bird forages in a region where restoration activities are  
30        occurring, the bird would be expected to avoid the slow-moving or stationary equipment.  
31        Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
32        *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
33        *Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best*  
34        *Management Practices for Biological Resources* (Appendix 3B) would minimize disturbance of  
35        habitat and avoid take of golden eagle, as defined by Section 86 of Fish and Game Code and would  
36        reduce the potential for injury, mortality, or the disruption of normal behaviors and disturbances to  
37        habitat for ferruginous hawk to less than significant. These impacts would be less than significant  
38        because the aforementioned environmental commitments would (1) train construction staff on  
39        protecting these species, the requirements for avoiding impacts, and the ramifications for not  
40        following these measures, (2) minimize dust; (3) implement spill prevention and containment plans  
41        that would avoid material spills that could affect habitat; and (4) have a biological monitor present  
42        that would ensure that all protective measures are being implemented where applicable. The impact  
43        on golden eagle and ferruginous hawk from the project with the CMP would be less than significant  
44        with mitigation.

### 1 Other Mitigation Measures

2 Some mitigation measures would involve ground disturbance, the use of heavy equipment, pile  
3 driving, or pesticides that would have the potential to expose golden eagle and ferruginous hawk to  
4 excessive noise, visual disturbance, dust, and hazardous materials that could cause loss of modeled  
5 habitat, disruption of normal behaviors, and injury or mortality. The mitigation measures with  
6 potential to result in impacts on golden eagle and ferruginous hawk are similar to those discussed  
7 under Impact BIO-31: *Impacts of the Project on Western Yellow-Billed Cuckoo*. Impacts on golden  
8 eagle and ferruginous hawk resulting from mitigation measures would be similar to construction  
9 effects of the project alternatives in certain construction areas and would contribute to golden eagle  
10 and ferruginous hawk impacts of the project alternatives.

11 The impacts of habitat loss, noise, visual disturbance, and exposure to dust or hazardous materials  
12 on golden eagle and ferruginous hawk would be reduced through the CMP, environmental  
13 commitments, and Mitigation Measure NOI-1: *Develop and Implement a Noise Control Plan* as  
14 detailed under Impact BIO-31: *Impacts of the Project on Western Yellow-Billed Cuckoo*. In addition,  
15 Mitigation Measure BIO-37: *Conduct Surveys for Golden Eagle and Avoid Disturbance of Occupied*  
16 *Nests* would require species-specific measures to reduce these impacts. Therefore, impacts on  
17 golden eagle and ferruginous hawk from implementation of other mitigation measures would be  
18 reduced to less than significant.

19 Overall, the impacts on golden eagle and ferruginous hawk from construction of compensatory  
20 mitigation and implementation of other mitigation measures, combined with project alternatives,  
21 would not change the impact conclusion of less than significant with mitigation.

### 22 **Impact BIO-38: Impacts of the Project on Ground-Nesting Grassland Birds**

23 The methods for the analysis of effects on ground-nesting grassland birds appear in Section 13.3.1.1,  
24 and information on the species' life histories and habitat suitability models are presented in the  
25 following species accounts in Appendix 13B: Section 13B.70, *Northern Harrier*, Section 13B.75,  
26 *Short-Eared Owl*, Section 13B.78, *California Horned Lark*, and Section 13B.80, *Grasshopper Sparrow*.

### 27 **All Project Alternatives**

#### 28 Construction

29 The construction of all project alternatives would affect modeled nesting habitat for northern  
30 harrier, short-eared owl, California horned lark, and grasshopper sparrow. Construction-related  
31 effects would include the permanent and temporary loss of habitat and potential injury and  
32 mortality of individual birds and eggs, as well as nest abandonment. Temporarily disturbed areas  
33 may be susceptible to increased cover of tall invasive weeds, which would reduce the herbaceous  
34 ground cover preferred for nesting by grasshopper sparrow and California horned lark (Unitt  
35 2008:396; Vickery 2020).

36 The loss of nesting habitat for northern harrier, short-eared owl, California horned lark, and  
37 grasshopper sparrow would primarily occur as a result of the construction of the Southern Forebay  
38 (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and the placement of RTM and associated conveyor  
39 features at the Twin Cities Complex (all project alternatives), on Bouldin Island (Alternatives 1, 2a,  
40 2b, 2c), and on Lower Roberts Island (Alternatives 3, 4a, 4b, 4c, and 5; Appendix 13C). Habitat loss  
41 from the construction of the levee improvements and new roads or road improvements would also

1 remove relatively narrow slivers of grassland habitat, which are unlikely to be used by short-eared  
 2 owl or northern harrier (Appendix 13C). The central alignment alternatives (Alternatives 1, 2a, 2b,  
 3 and 2c) would result in greater impacts on modeled habitat compared to the eastern alignment  
 4 alternatives (Alternatives 3, 4a, 4b, and 4c) and the Bethany Reservoir alignment alternative  
 5 (Alternative 5) largely because of levee improvements on Bouldin Island (Appendix 13C).  
 6 Construction of the Bethany Complex and associated access roads (Alternative 5) would also remove  
 7 modeled habitat for these species. Acres of permanent and temporary impacts on modeled habitat  
 8 for northern harrier and short-eared owl are shown in Table 13-79; impacts on modeled habitat for  
 9 California horned lark and grasshopper sparrow are shown in Table 13-80. Environmental  
 10 Commitment EC-14: *Construction Best Management Practices for Special-Status Species* would ensure  
 11 that temporarily disturbed areas are restored (Appendix 3B).

12 **Table 13-79. Impacts on Modeled Nesting and Foraging Habitat for Northern Harrier and Short-**  
 13 **Eared Owl by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	2,007.30	198.40	2,205.70
2a	2,175.28	215.90	2,391.18
2b	1,784.06	211.54	1,995.60
2c	1,898.76	217.77	2,116.53
3	2,020.17	204.26	2,224.43
4a	2,248.36	203.81	2,452.17
4b	1,750.89	199.36	1,950.25
4c	1,904.04	205.60	2,109.64
5	1,322.66	87.64	1,410.30

14 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 15 discussion in Section 13.3.1.2.  
 16

17 **Table 13-80. Impacts on Modeled Habitat for California Horned Lark and Grasshopper Sparrow by**  
 18 **Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	2,311.30	258.57	2,569.87
2a	2,503.07	286.79	2,789.86
2b	2,074.76	278.45	2,353.21
2c	2,196.98	285.27	2,482.25
3	2,114.40	236.80	2,351.20
4a	2,374.06	239.75	2,613.81
4b	1,839.53	231.33	2,070.86
4c	2,000.18	238.16	2,238.34
5	1,381.89	115.31	1,497.20

19 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 20 discussion in Section 13.3.1.2.  
 21

22 Grasshopper sparrows and short-eared owl are considered rare breeders in the study area (Unitt  
 23 2008:395; Roberson 2008:244) but northern harrier and California horned lark have a high

1 potential to occur within or adjacent to work areas. Ground disturbance (e.g., grubbing during site  
2 preparation) in suitable habitat for these ground-nesting species could crush eggs or kill nestlings in  
3 active nests. Construction-generated noise and vibration near active nests could cause adults to  
4 abandon eggs or recently hatched young if they perceive such disturbances as a threat. Construction  
5 activities are not expected to injure or kill foraging or nonbreeding adults or fledged juveniles who  
6 are no longer dependent on adults because individuals are mobile and would avoid direct injury or  
7 mortality from slow-moving or stationary construction equipment. Night lighting may have the  
8 potential to affect the behavior of nesting individuals, as studies show that birds are attracted to  
9 artificial lights, which may disrupt their behavioral patterns or cause collision-related fatalities  
10 (Gauthreaux and Belser 2006:67–86). All lights used during nighttime construction would be  
11 downcast, cut-off type fixtures with non-glare finishes, natural light qualities, and minimum  
12 intensity. Construction-related lighting would be shielded and oriented in such a manner so as not to  
13 subject the immediate surroundings to extremes in the levels of light, however, these types of light  
14 generate an ambient nighttime luminescence that is visible from a distance. Effects of construction-  
15 related light would be greater at the intakes where existing conditions are dark and rural in  
16 comparison with the Twin Cities Complex, Southern Complex, and Bethany Complex where there are  
17 existing sources of light that may illuminate suitable habitat. Construction activities could result in  
18 dust and the discharge of construction-related fluids, which could also affect these species and their  
19 habitat if present in or adjacent to work areas. Environmental Commitments EC-1: *Conduct Worker*  
20 *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
21 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive*  
22 *Dust Control*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix  
23 3B) would reduce these potential impacts by (1) training construction staff on protecting these  
24 species, reporting requirements, and the ramifications for not following these measures; (2)  
25 implementing spill prevention and containment plans that would avoid material spills that could  
26 affect suitable habitat; and (3) having a biological monitor present that would ensure that non-  
27 disturbance buffers are intact and all protective measures are being implemented, where applicable.

28 Grasshopper sparrow and short-eared owl are considered rare breeders in the study area (Unitt  
29 2008:395; Roberson 2008:244), but northern harrier and California horned lark have a high  
30 potential to occur within or adjacent to work areas. There are no known CNDDDB occurrences of  
31 grasshopper sparrow, short-eared owl, or California horned lark in the vicinity of project facilities  
32 (California Department of Fish and Wildlife 2020a), but there are known occurrences of northern  
33 harrier nesting throughout the study area, including two occurrences in the vicinity of the Southern  
34 Complex and two occurrences in the vicinity of the Bethany Complex (California Department of  
35 Water Resources 2011).

36 Field investigations would be conducted prior to and during construction under all project  
37 alternatives to more specifically identify appropriate construction methods and design criteria  
38 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
39 existing utilities, and address the establishment of geological and groundwater monitoring  
40 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
41 would involve a variety of ground-disturbing activities that would vary in duration from several  
42 hours to approximately 6 weeks (Section 3.15; Delta Conveyance Design and Construction Authority  
43 2022a, 2022b) and could result in impacts on habitat and the potential for injury, mortality, and the  
44 disruption of normal behaviors of grassland birds. Geotechnical investigations that would occur in  
45 the West Tracy Fault Study area, and over the tunnel alignment footprints which include test  
46 trenches, CPTs, soil borings, and geophysical arrays, would result in temporary impacts on modeled

1 habitat (Appendix 13C). The Bethany Fault Study geotechnical investigations (Alternative 5) would  
2 be completed in a single day and would involve placing approximately 20 ERT probes 0.5 inch in  
3 diameter. The study would be conducted entirely on foot, perpendicular to the tunneled portion of  
4 the Bethany Reservoir Aqueduct (Delta Conveyance Design and Construction Authority 2022a,  
5 2022b). The Bethany Fault Study could result in minor disruption of normal behaviors, but because  
6 of its small footprint and the short (1-day) duration of the disturbance, impacts on modeled habitat  
7 are not quantified and are considered negligible. The following field investigations would be  
8 conducted within proposed surface construction footprints of project facilities (including portions of  
9 tunnel alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT,  
10 groundwater testing and monitoring, monument installation, pilot studies for settlement, agronomic  
11 testing, and utility potholing. These temporary impacts are not characterized as an additional loss of  
12 habitat because impacts for these locations have already been quantified within the construction-  
13 related footprints but could still result in the potential for injury, mortality, and disruption of normal  
14 behaviors of grassland-nesting birds if present in the vicinity, as discussed above for conveyance  
15 facility construction. Noise and visual disturbances from helicopter surveys to identify buried  
16 groundwater and natural gas wells throughout the project area may also cause disturbance to  
17 nesting individuals, as described above under construction-related effects. Environmental  
18 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
19 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
20 *Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
21 (Appendix 3B) would reduce these potential impacts by (1) training construction staff on protecting  
22 these species, reporting requirements, and the ramifications for not following these measures; (2)  
23 implementing spill prevention and containment plans that would avoid material spills that could  
24 affect suitable habitat; and (3) having a biological monitor present that would ensure that non-  
25 disturbance buffers are intact and all protective measures are being implemented, where applicable.

### 26 Operations

27 The operation of project facilities would not require ground disturbance or result in additional  
28 habitat loss, but project operations would generate small levels of noise, have permanent light  
29 sources, and require the periodic presence of staff and vehicle traffic. Noise from the operation of  
30 the water conveyance facilities would not be discernably higher than existing conditions (Chapter  
31 24, Section 24.4.3.2). Permanent facility lighting associated with project facilities under all  
32 alternatives could extend into suitable habitat for grassland birds, which could affect the behavior of  
33 individuals, as described above under construction-related effects; however, as stated in Chapter 3,  
34 Section 3.4.12, permanent lighting at project facilities would be motion activated, downcast, cut-off  
35 type fixtures with non-glare finishes, and therefore permanent facilities would remain dark the  
36 majority of the time at night, which would minimize the potential for this impact.

37 Power for construction and operation of the conveyance facilities has been designed to use existing  
38 power lines and underground conduit to the extent feasible. Most new project lines would be placed  
39 on existing poles and towers and therefore would not substantially alter the existing landscape.  
40 However, new aboveground high-voltage transmission and SCADA lines would be constructed to  
41 power the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and the Bethany Complex  
42 under Alternative 5 (Chapter 3, Figure 3-13 and Figure 3-14). The potential for collisions with new  
43 project lines varies by species and depends primarily on its level of exposure (or proximity of the  
44 bird's habitat and resources to the transmission line) and its sensitivity (morphological and  
45 behavioral characteristics that influence the bird's propensity to collide with a line). California

1       horned lark form large flocks in the winter (Green 2008:1), making them more vulnerable than  
2       species such as the grasshopper sparrow who may form small, breeding groups of 3 to 12 pairs, but  
3       do not flock in winter or summer (Dobkin and Granholm 2008:2). Short-eared owl and northern  
4       harrier tend to forage on the wing at elevations below the height of the proposed project  
5       transmission lines (Polite 2005:1, 2008:1) and would therefore be at a lower risk of collision with  
6       project lines. Transmission line towers also provide perching substrate for raptors, which are  
7       predators to California horned lark and grasshopper sparrow. The existing network of transmission  
8       lines in the study area currently poses these risks and any incremental risk associated with the new  
9       power line corridors would be expected to be low.

#### 10       Maintenance

11       The maintenance of aboveground water conveyance facilities for all project alternatives could result  
12       in periodic disturbances that could affect grassland birds. Maintenance activities across all facilities  
13       that could cause impacts (all alternatives) include repaving of access roads every 15 years,  
14       semiannual general and ground maintenance (e.g., mowing, vegetation trimming, herbicide  
15       application), and daily or weekly inspections by vehicle. Maintenance activities at launch, reception,  
16       and maintenance shafts along the central alignment (Alternatives 1, 2a, 2b, and 2c), eastern  
17       alignment (Alternatives 3, 4a, 4b, and 4c), and Bethany Reservoir alignment (Alternative 5) would  
18       include similar semiannual general and ground maintenance in addition to daily inspections by  
19       vehicle. Maintenance at the Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) would  
20       also include annual embankment repair and quarterly animal burrow filling. If these activities take  
21       place during the breeding season (February 1 through August 31), they could disrupt foraging and  
22       nesting behaviors and result in potential injury and mortality of individuals. Herbicide application  
23       could reduce the functions of foraging habitat and result in direct mortality of individuals if present.  
24       Adults and fledged young would be expected to avoid slow-moving maintenance equipment and  
25       therefore there would be a low probability of vehicle strikes of nonbreeding birds. Maintenance  
26       activities would generally be conducted during the day, except for emergency maintenance, and  
27       would therefore not require additional lighting. Noise effects from maintenance activities could  
28       negatively affect breeding birds, as described above under construction-related effects.

#### 29       **CEQA Conclusion—All Project Alternatives**

30       Construction, operations, and maintenance of the water conveyance facilities under all project  
31       alternatives would result in impacts on ground-nesting grassland birds (northern harrier, short-  
32       eared owl, California horned lark, and grasshopper sparrow) through the permanent and temporary  
33       loss of modeled habitat and the potential for injury, mortality, and the disruption of normal  
34       behaviors.

35       The temporary impacts on habitat and potential impacts of injury, mortality, or disruption of normal  
36       behaviors from project construction, operations, and maintenance activities would be reduced by  
37       Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
38       *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
39       *Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best*  
40       *Management Practices for Special-Status Species* (Appendix 3B); however, even with these  
41       commitments, the impacts of the project alternatives on northern harrier, short-eared owl,  
42       California horned lark, and grasshopper sparrow would be significant. The CMP would be required  
43       to offset the loss of habitat by creating and protecting grassland habitat (Appendix 3F, Section  
44       3F.3.3) on Bouldin Island and the I-5 ponds and from the protection of agricultural foraging habitat



1 for sandhill cranes, Swainson's hawk, and tricolored blackbird (Appendix 3F, Attachment 3F.1, Table  
2 3F.1-3), which would mitigate the loss of habitat for northern harrier, short-eared owl, California  
3 horned lark, and grasshopper sparrow to a less-than-significant level.

4 Mitigation Measures AES-4b: *Minimize Fugitive Light from Portable Sources Used for Construction*;  
5 AES-4c: *Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light Spill from Truck*  
6 *Headlights toward Residences* (Chapter 18); NOI-1: *Develop and Implement a Noise Control Plan*  
7 (Chapter 24); BIO-2b: *Avoid and Minimize Impacts on Biological Resources from Maintenance*  
8 *Activities*; BIO-2c: *Electrical Power Line Support Placement*; and BIO-36a: *Conduct Nesting Surveys for*  
9 *Special-Status and Non-Special-Status Birds and Raptors and Implement Protective Measures to Avoid*  
10 *Disturbance of Nesting Birds and Raptors*, would be required to avoid and minimize the potential for  
11 injury, mortality, or the disruption of normal behaviors and disturbances to habitat. The impacts on  
12 northern harrier, short-eared owl, California horned lark, and grasshopper sparrow from the project  
13 alternatives would be less than significant with mitigation because the aforementioned measures  
14 would reduce direct effects on the species, including habitat, noise, and visual disturbances, by  
15 providing environmental awareness training to construction personnel, by implementing protective  
16 measures during maintenance activities, and avoidance measures for nesting birds during  
17 construction.

#### 18 **Mitigation Measure CMP: Compensatory Mitigation Plan**

19 The CMP (see Impact BIO-1 for a summary discussion of the CMP) would offset the loss of  
20 habitat for northern harrier, short-eared owl, California horned lark, and grasshopper sparrow  
21 by creating and protecting grasslands on Bouldin Island and the I-5 ponds (Appendix 3F, Section  
22 3F.3.3.2) and through the protection and management of agricultural foraging habitat for  
23 sandhill crane, Swainson's hawk, and tricolored blackbird (Appendix 3F, Attachment 3F.1, Table  
24 3F.1-3, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19b: *Swainson's Hawk Foraging Habitat*,  
25 CMP-22b: *Tricolored Blackbird Foraging Habitat*). The creation and protection of wetlands and  
26 riparian natural communities would also provide suitable habitat for northern harrier and  
27 short-eared owl (Appendix 3F, Section 3F.3.3.1).

#### 28 **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for** 29 **Construction**

30 See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

#### 31 **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary,** 32 **to Prevent Light Spill from Truck Headlights toward Residences**

33 See description of Mitigation Measure AES-4c under Impact AES-4 in Chapter 18.

#### 34 **Mitigation Measure NOI-1: Develop and Implement a Noise Control Plan**

35 See description of Mitigation Measure NOI-1 under Impact NOI-1 in Chapter 24.

#### 36 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 37 **Resources from Maintenance Activities**

38 See description of Mitigation Measure BIO-2b under Impact BIO-2.

1           **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

2           See description of Mitigation Measure BIO-2c under Impact BIO-2.

3           **Mitigation Measure BIO-36a: Conduct Nesting Surveys for Special-Status and Non-Special-**  
4           **Status Birds and Raptors and Implement Protective Measures to Avoid Disturbance of**  
5           **Nesting Birds and Raptors**

6           See description of Mitigation Measure BIO-36a under Impact BIO-36.

7           ***Mitigation Impacts***

8           As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
9           mitigation measure impacts. The analyses below consider the potential impacts associated with  
10          implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
11          Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
12          *Measures*.

13          *Compensatory Mitigation*

14          The creation and enhancement of wetlands as well as habitat for special-status species under the  
15          project's CMP would affect northern harrier, short-eared owl, California horned lark, and  
16          grasshopper sparrow through the permanent and temporary loss of habitat (Appendix 13C) from  
17          vegetation removal and grading to create the appropriate topography and soil conditions to  
18          establish or restore habitats.

19          In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
20          enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
21          vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located, which could  
22          support suitable habitat for northern harrier, short-eared owl, California horned lark, and  
23          grasshopper sparrow and could result in the disruption of normal behaviors, injury, or mortality of  
24          individuals. Site-specific analyses are not provided because locations of potential non-bank sites are  
25          not currently known.

26          Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
27          crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
28          management of agricultural areas but may also include natural communities in the study area  
29          (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
30          *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
31          CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
32          CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could potentially contain suitable  
33          habitat for northern harrier, short-eared owl, California horned lark, and grasshopper sparrow and  
34          management activities could affect this habitat and result in the disruption of normal behaviors,  
35          injury, or mortality. Site-specific analyses are not provided because locations of potential protection  
36          instruments are not currently known.

37          The CMP and site-specific permitting approvals would account for any losses of nesting habitat from  
38          habitat creation by adjusting the overall commitment of riparian and wetland creation and  
39          grassland and cultivated lands protection (Appendix 3F, Section 3F.1, Section 3F.2.4, and  
40          Attachment 3F.1, Table 3F.1-3, CMP-0: *General Design Guidelines*) and therefore reduce any habitat  
41          losses associated with the CMP to less than significant. The creation and enhancement activities

1 would also have the potential for injury, mortality, and the disruption of normal behaviors of  
2 individuals if restoration activities occur during the breeding season (February 1 through August  
3 31), as described above under construction-related effects. Environmental Commitments EC-1:  
4 *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management*  
5 *Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11:  
6 *Fugitive Dust Control*; and EC-14: *Construction Best Management Practices for Biological Resources*  
7 (Appendix 3B); and Mitigation Measure BIO-36a: *Conduct Nesting Surveys for Special-Status and*  
8 *Non-Special-Status Birds and Raptors and Implement Protective Measures to Avoid Disturbance of*  
9 *Nesting Birds and Raptors* would reduce the potential for injury, mortality, and the disruption of  
10 normal behaviors of individuals to less than significant. These impacts would be less than significant  
11 with mitigation because the aforementioned measures would (1) train construction staff on  
12 protecting nesting birds, the requirements for avoiding impacts, and the ramifications for not  
13 following these measures; (2) minimize dust; (3) implement spill prevention and containment plans  
14 that would avoid material spills that could affect habitat; (4) prior to and during implementing  
15 restoration and enhancement ground disturbance, establish protective buffers around occupied nest  
16 sites; and (5) have a biological monitor present that would ensure that non-disturbance buffers are  
17 intact and all protective measures are being implemented where applicable. The impact on ground-  
18 nesting grassland birds (northern harrier, short-eared owl, California horned lark, and grasshopper  
19 sparrow) from the project alternatives with the CMP would be less than significant with mitigation.

#### 20 Other Mitigation Measures

21 Some mitigation measures would involve ground disturbance, the use of heavy equipment, pile  
22 driving, or pesticides that would have the potential to expose ground-nesting grassland birds such  
23 as northern harrier, short-eared owl, California horned lark, and grasshopper sparrow to excessive  
24 noise, visual disturbance, dust, and hazardous materials that could cause loss of modeled habitat,  
25 disruption of normal behaviors, and injury or mortality. The mitigation measures with potential to  
26 result in impacts on northern harrier, short-eared owl, California horned lark, and grasshopper  
27 sparrow are similar to those discussed under Impact BIO-31: *Impacts of the Project on Western*  
28 *Yellow-Billed Cuckoo*. Impacts on northern harrier, short-eared owl, California horned lark, and  
29 grasshopper sparrow resulting from mitigation measures would be similar to construction effects of  
30 the project alternatives in certain construction areas and would contribute to northern harrier,  
31 short-eared owl, California horned lark, and grasshopper sparrow impacts of the project  
32 alternatives.

33 The impacts of habitat loss, noise, visual disturbance, and exposure to dust or hazardous materials  
34 on northern harrier, short-eared owl, California horned lark, and grasshopper sparrow would be  
35 reduced through the CMP, environmental commitments, and Mitigation Measure NOI-1: *Develop and*  
36 *Implement a Noise Control Plan* as detailed under Impact BIO-31: *Impacts of the Project on Western*  
37 *Yellow-Billed Cuckoo*. In addition, Mitigation Measure BIO-36a: *Conduct Nesting Surveys for Special-*  
38 *Status and Non-Special-Status Birds and Raptors and Implement Protective Measures to Avoid*  
39 *Disturbance of Nesting Birds and Raptors* would require species-specific measures to reduce these  
40 impacts. Therefore, impacts on northern harrier, short-eared owl, California horned lark, and  
41 grasshopper sparrow from implementation of other mitigation measures would be reduced to less  
42 than significant.

43 Overall, the impacts on northern harrier, short-eared owl, California horned lark, and grasshopper  
44 sparrow from construction of compensatory mitigation and implementation of other mitigation

1 measures, combined with project alternatives, would not change the impact conclusion of less than  
2 significant with mitigation.

### 3 **Impact BIO-39: Impacts of the Project on Swainson's Hawk**

4 The methods for the analysis of effects on Swainson's hawk appear in Section 13.3.1.1, and  
5 information on the species life history and habitat suitability model are presented in the species  
6 account in Appendix 13B, Section 13B.72, *Swainson's Hawk*.

#### 7 ***All Project Alternatives***

##### 8 *Construction*

9 Construction-related effects on Swainson's hawk from all project alternatives would include the  
10 permanent and temporary loss of modeled nesting and foraging habitat, and the potential for injury,  
11 mortality, and the disruption of normal behaviors. The loss of Swainson's hawk modeled nesting  
12 habitat would primarily occur as a result of levee improvements, new roads and road  
13 improvements, and construction of the intakes (Appendix 13C). The central alignment alternatives  
14 (Alternatives 1, 2a, 2b, and 2c) would result in greater impacts on modeled nesting habitat  
15 compared to the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and the Bethany  
16 Reservoir alignment alternative (Alternative 5) largely because of the levee improvements on  
17 Bouldin Island and road improvements throughout the central alignment.

18 Because the availability of foraging habitat has been closely tied to the breeding success of this  
19 species, projects that would significantly modify suitable Swainson's hawk foraging habitat are  
20 considered to have potential to significantly affect this species (California Department of Fish and  
21 Game 1994:7). The loss of Swainson's hawk modeled foraging habitat would occur primarily as a  
22 result of the construction of the Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and  
23 the placement of RTM (all alternatives; Appendix 13C). Habitat loss from the construction of the  
24 intakes, levee improvements, and new roads or road improvements under all alternatives would  
25 remove relatively narrow slivers of grassland and cultivated lands that are less likely to be used for  
26 foraging by the species. Acres of permanent and temporary impacts on modeled habitat for  
27 Swainson's hawk are shown in Table 13-81. Environmental Commitment EC-14: *Construction Best*  
28 *Management Practices for Special-Status Species* would ensure that temporarily disturbed areas are  
29 restored (Appendix 3B).

30 **Table 13-81. Impacts on Modeled Nesting and Foraging Habitat for Swainson's Hawk by**  
31 **Alternative**

Alternative	Permanent Impacts— Nesting (acres) <sup>a</sup>	Permanent Impacts— Foraging (acres) <sup>a</sup>	Temporary Impacts— Nesting (acres)	Temporary Impacts— Foraging (acres)	Total (acres)
1	16.92	2,774.68	9.23	304.40	3,105.23
2a	17.29	3,071.09	11.38	332.68	3,432.44
2b	12.24	2,463.89	10.48	325.09	2,811.70
2c	14.40	2,627.08	10.88	333.10	2,985.46
3	15.21	2,539.11	8.40	249.48	2,812.20
4a	17.39	2,878.41	9.04	250.49	3,155.33
4b	12.34	2,221.57	8.15	242.93	2,484.99

Alternative	Permanent Impacts—Nesting (acres) <sup>a</sup>	Permanent Impacts—Foraging (acres) <sup>a</sup>	Temporary Impacts—Nesting (acres)	Temporary Impacts—Foraging (acres)	Total (acres)
4c	14.50	2,405.92	8.55	250.90	2,679.87
5	17.33	1,643.98	7.82	141.23	1,810.36

<sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see discussion in Section 13.3.1.2.

The losses of modeled nesting habitat and potential for injury and mortality would result from vegetation removal in advance of grading and excavation for the construction of project infrastructure. Removal of nests during the breeding season and construction disturbance within 0.25 mile of occupied Swainson's hawk nests could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Swainson's hawks tend not to be vulnerable to construction disturbance and often construct nests near existing construction sites or other human-disturbance areas. Construction activities have a sliding scale of risk to nesting Swainson's hawks, from high to low: physical contact with the nest tree, activities that occur close to the nest at nest height or above, human activity close to the nest tree, and mechanical activity close to the nest tree. In general, as the distance between the nest and activity increases, risk to nesting success declines (Swainson's Hawk Technical Advisory Committee 2000:5). Swainson's hawks in the Delta often nest adjacent to active farm operations and are not very sensitive to loud construction noise or equipment. In rare instances, Swainson's hawk pairs have shown themselves to be particularly sensitive to humans close to their nests but are less affected by mechanical disturbances (Swainson's Hawk Technical Advisory Committee 2000:5).

Foraging Swainson's hawks are highly mobile and would avoid direct injury or mortality from slow-moving or stationary construction equipment. Furthermore, Swainson's hawks frequently forage in the vicinity of operating farm equipment, therefore the presence of construction equipment and its associated noise is not expected to disrupt Swainson's hawk foraging behavior. Night lighting may have the potential to affect the behavior of Swainson's hawk; however, all lights used during nighttime construction would be downcast, cut-off type fixtures with non-glare finishes, natural light qualities, and minimum intensity. Construction-related lighting would be shielded and oriented in such a manner so as not to subject the immediate surroundings to extremes in the levels of light, however, these types of light generate an ambient nighttime luminescence that is visible from a distance. Effects of construction-related light would be greater at the intakes where existing conditions are dark and rural in comparison with the Twin Cities Complex, Southern Complex, and Bethany Complex, where there are existing sources of light that may illuminate suitable habitat. Construction activities could result in dust and the discharge of construction-related fluids, which could affect individuals and their habitat if present in or adjacent to work areas. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training construction staff on protecting the species, reporting requirements, and the ramifications for not following these measures; (2) implementing spill prevention and containment plans that would avoid material spills that could affect suitable habitat; and (3) having a biological monitor present that would ensure that non-disturbance buffers are intact and all protective measures are being implemented, where applicable.

1 There are up to 36 known occurrences of nesting Swainson’s hawk within the construction footprint  
2 for the central alignment alternatives (Alternatives 1, 2a, 2b, and 2c), up to 37 occurrences of  
3 nesting Swainson’s hawk within the construction footprint for the eastern alignment alternatives  
4 (Alternatives 3, 4a, 4b, and 4c), and up to 31 occurrences of nesting Swainson’s hawk for the  
5 Bethany Reservoir alignment alternative (Alternative 5) (California Department of Fish and Wildlife  
6 2020a; California Department of Water Resources 2011). However, Swainson’s hawk nests are  
7 ubiquitous throughout the study area.

8 Field investigations would be conducted prior to and during construction under all alternatives to  
9 more specifically identify appropriate construction methods and design criteria addressed in the  
10 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
11 and address the establishment of geological and groundwater monitoring programs (Delta  
12 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
13 variety of ground-disturbing activities that would vary in duration from several hours to  
14 approximately 6 weeks (Section 3.15; Delta Conveyance Design and Construction Authority 2022a,  
15 2022b) and could result in impacts on habitat and the potential for injury, mortality, and the  
16 disruption of normal behaviors of Swainson’s hawk. Geotechnical investigations associated with the  
17 tunnels for all alternatives, which include CPTs, and soil borings, would result in impacts on  
18 modeled habitat (Appendix 13C). The West Tracy Fault investigations would not affect modeled  
19 nesting habitat, but they would occur within modeled Swainson’s hawk foraging habitat. The  
20 Bethany Fault Study geotechnical investigations (Alternative 5) would be completed in a single day  
21 and would involve placing approximately 20 ERT probes 0.5 inch in diameter. The study would be  
22 conducted entirely on foot, perpendicular to the tunneled portion of the Bethany Reservoir  
23 Aqueduct (Delta Conveyance Design and Construction Authority 2022a, 2022b). The Bethany Fault  
24 Study could result in minor disruption of normal behaviors, but because of its small footprint and  
25 the short (1-day) duration of the disturbance, impacts on modeled habitat are not quantified and are  
26 considered negligible. The following field investigations would be conducted within proposed  
27 surface construction footprints of project facilities (including portions of tunnel alignments) and  
28 would temporarily affect habitat: test trenches, CPTs, soil borings, ERT, groundwater testing and  
29 monitoring, monument installation, pilot studies for settlement, agronomic testing, and utility  
30 potholing. These temporary impacts are not characterized as an additional loss of habitat because  
31 impacts for these locations have already been quantified within the construction-related footprints  
32 but could still result in the potential for injury, mortality, and disruption of normal behaviors of  
33 Swainson’s hawk if present in the vicinity, as discussed above for conveyance facility construction.  
34 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
35 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
36 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
37 *Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training  
38 construction staff on protecting the species, reporting requirements, and the ramifications for not  
39 following these measures; (2) implementing spill prevention and containment plans that would  
40 avoid material spills that could affect suitable habitat; and (3) having a biological monitor present  
41 that would ensure that non-disturbance buffers are intact and all protective measures are being  
42 implemented, where applicable. Noise and visual disturbances from helicopter surveys to identify  
43 buried groundwater and natural gas wells throughout the project area and pile installation test  
44 methods at the north Delta intakes may cause disturbance to nesting Swainson’s hawks.

## 1        Operations

2        The operation of project facilities would not require ground disturbance or result in additional  
3        habitat loss, but project operations would generate small levels of noise, have permanent light  
4        sources, and require the periodic presence of staff and vehicle traffic. Noise from the operation of  
5        the water conveyance facilities would not be discernably higher than existing conditions (Chapter  
6        24, Section 24.4.3.2). The periodic presence of staff and vehicle traffic at project facilities would not  
7        be expected to significantly alter the behavior of Swainson's hawk because they are known to nest  
8        and forage in areas of disturbance, as described above under construction-related effects.  
9        Permanent facility lighting associated with project facilities under all alternatives could extend into  
10       Swainson's hawk nesting and foraging habitat, which could affect the behavior of individuals, as  
11       described above under construction-related effects; however, as stated in Chapter 3, Section 3.4.12,  
12       permanent lighting at project facilities would be motion activated, downcast, cut-off type fixtures  
13       with non-glare finishes, and therefore permanent facilities would remain dark the majority of the  
14       time at night, which would minimize the potential for this impact.

15       Power for construction and operation of the conveyance facilities has been designed to use existing  
16       power lines and underground conduit to the extent feasible under all alternatives. Most new project  
17       lines would be placed on existing poles and towers and therefore would not substantially alter the  
18       existing landscape. However, new aboveground high-voltage transmission and SCADA lines would  
19       be constructed to power the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and  
20       Bethany Complex under Alternative 5 (Chapter 3, Figure 3-13 and Figure 3-14). Although  
21       Swainson's hawks hunt within the range of heights proposed for the new transmission lines, their  
22       keen vision and high maneuverability substantially reduce power line collision risk for the species.  
23       Like other diurnal raptors, Swainson's hawks have highly developed eyesight (Potier et al. 2020:8;  
24       Mitkus et al. 2018:1), allowing them to detect small prey while hunting from relatively high  
25       altitudes. The keen eyesight of raptors, including Swainson's hawks, also allows detection and  
26       avoidance of other aerial objects, including aboveground utility lines (Slater et al. 2020:198). Like  
27       many other Falconiformes, Swainson's hawk has a long, narrow, tapered wings and body size that  
28       allow for efficient soaring flight and highly developed aerial maneuverability (Bevanger 1998:69,  
29       Bechard et al. 2020). In addition, Swainson's hawks are less active during inclement weather and are  
30       not typically observed in flight during rainy or foggy conditions (Fitzner 1980:30). The species'  
31       general maneuverability, its keen eyesight, and fair-weather flight behavior make it a low relative  
32       risk for power line collision mortality. Raptors are subject to electrocution from powerlines;  
33       however, most electrocutions of raptors occur at low voltage distribution lines because of the small  
34       spacing between uninsulated energized components (Slater et al. 2020:198). Large transmission  
35       lines, such as the proposed project lines pose minimal electrocution risk to raptors, including  
36       Swainson's hawks because of the inherently large spacing required between the electrified  
37       components (Slater et al. 2020:198).

## 38       Maintenance

39       The maintenance of aboveground water conveyance facilities for all project alternatives would  
40       result in periodic disturbances within and adjacent to Swainson's hawk nesting and foraging habitat.  
41       Maintenance activities at the north Delta intakes (all alternatives) would include semiannual general  
42       and ground maintenance (e.g., mowing, vegetation trimming, herbicide application), annual  
43       sediment and debris removal at intakes, and periodic maintenance of the intake gates and  
44       associated structures approximately every 1 to 5 years. Maintenance activities at launch, reception,  
45       and maintenance shafts along the central (Alternatives 1, 2a, 2b, and 2c), eastern (Alternatives 3, 4a,

1 4b, and 4c), and Bethany Reservoir (Alternative 5) alignments would include similar semiannual  
2 general and ground maintenance in addition to daily inspections by vehicle. Existing access roads in  
3 the vicinity of the intakes and shafts would be repaved every 15 years, which could cause noise and  
4 visual disturbances to individuals if active nests were present within work areas.

5 Large equipment or cranes required for maintenance of the intakes (all alternatives), Southern  
6 Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c), or Bethany Complex (Alternative 5) or any  
7 vegetation management that involves tree-trimming or tree removal could disrupt nesting  
8 behaviors or result in potential injury or mortality of individuals. Maintenance activities would  
9 generally be conducted during the day, except for emergency maintenance, and would therefore not  
10 require additional lighting. Residual noise or visual disturbance from maintenance activities at  
11 water conveyance facilities under all alternatives is not expected to substantially affect Swainson's  
12 hawk because they are known to nest and forage in areas of disturbance, as described above under  
13 construction-related effects.

#### 14 ***CEQA Conclusion—All Project Alternatives***

15 Construction, operations, and maintenance of the water conveyance facilities under all project  
16 alternatives would result in impacts on Swainson's hawk through the permanent and temporary  
17 loss of modeled habitat of a special-status species and the potential for injury, mortality, and the  
18 disruption of normal behaviors. Loss of Swainson's hawk eggs or nests, any activities resulting in  
19 nest abandonment, would be considered a significant impact. The temporary impacts on habitat and  
20 potential impacts of injury, mortality, or disruption of normal behaviors from project construction,  
21 operations, and maintenance, including the loss of Swainson's hawk eggs or nests, any activities  
22 resulting in nest abandonment, would be reduced by Environmental Commitments EC-1: *Conduct*  
23 *Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*;  
24 *EC-3: Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11:  
25 *Fugitive Dust Control*; and EC-14: *Construction Best Management Practices for Special-Status Species*  
26 (Appendix 3B); however, even with these commitments, the impacts of the project alternatives on  
27 Swainson's hawk would be significant. The CMP would be required to offset the loss of nesting and  
28 foraging habitat by creating and protecting riparian, grassland, and agricultural foraging habitat  
29 (Appendix 3F, Section 3F.3.3.1, Section 3F.3.3.2, and Attachment 3F.1, Table 3F.1-3, CMP-19a:  
30 *Swainson's Hawk Nesting Habitat* and CMP-19b: *Swainson's Hawk Foraging Habitat*), which would  
31 mitigate the loss of nesting and foraging habitat to a less-than-significant level. Mitigation Measures  
32 *AES-4b: Minimize Fugitive Light from Portable Sources Used for Construction*; *AES-4c: Install Visual*  
33 *Barriers along Access Routes, Where Necessary, to Prevent Light Spill from Truck Headlights toward*  
34 *Residences* (Chapter 18); *NOI-1: Develop and Implement a Noise Control Plan* (Chapter 24); *BIO-2b:*  
35 *Avoid and Minimize Impacts on Biological Resources from Maintenance Activities*; *BIO-2c: Electrical*  
36 *Power Line Support Placement*; and *BIO-39: Conduct Preconstruction Surveys and Implement*  
37 *Protective Measures to Minimize Disturbance of Swainson's Hawk* would be required to avoid and  
38 minimize the potential for injury, mortality, or the disruption of normal behaviors and disturbances  
39 to habitat. The impacts on Swainson's hawk from the project alternatives would be less than  
40 significant with mitigation because the aforementioned measures would replace lost habitat, reduce  
41 direct effects on the species, including habitat, noise, and visual disturbances, by providing  
42 environmental awareness training to construction personnel, by implementing protective measures  
43 during maintenance activities, and avoidance measures for nesting Swainson's hawk during  
44 construction.



1           **Mitigation Measure CMP: Compensatory Mitigation Plan**

2           The CMP (see Impact BIO-1 for a summary discussion of the CMP) would offset the loss of  
3           Swainson’s hawk nesting habitat by creating and protecting riparian habitat (Appendix 3F,  
4           Section 3F.3.3.1, Attachment 3F.1, Table 3F.1-3, CMP-19a: *Swainson’s Hawk Nesting Habitat*) and  
5           by compensating for the temporal loss of suitable Swainson’s hawk nest sites, and for the loss of  
6           nest trees (Attachment 3F.1, Table 3F.1-3, CMP-19a: *Swainson’s Hawk Nesting Habitat*). The CMP  
7           would offset the loss of Swainson’s hawk foraging habitat through the protection and  
8           management of grassland and agricultural lands (Appendix 3F, Section 3F.3.3.2, and Attachment  
9           3F.1, Table 3F.1-3, CMP-19b: *Swainson’s Hawk Foraging Habitat*).

10           **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for**  
11           **Construction**

12           See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

13           **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary,**  
14           **to Prevent Light Spill from Truck Headlights toward Residences**

15           See description of Mitigation Measure AES-4c under Impact AES-4 in Chapter 18.

16           **Mitigation Measure NOI-1: Develop and Implement a Noise Control Plan**

17           See description of Mitigation Measure NOI-1 under Impact NOI-1 in Chapter 24.

18           **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
19           **Resources from Maintenance Activities**

20           See description of Mitigation Measure BIO-2b under Impact BIO-2.

21           **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

22           See description of Mitigation Measure BIO-2c under Impact BIO-2.

23           **Mitigation Measure BIO-39: Conduct Preconstruction Surveys and Implement Protective**  
24           **Measures to Minimize Disturbance of Swainson’s Hawk**

25           ***All Project Alternatives***

26           The following measures will be required for activities occurring in suitable Swainson’s hawk  
27           habitat.

- 28           1. Preconstruction Surveys. Preconstruction surveys will be conducted by a CDFW-approved  
29           biologist(s) to identify the presence of suitable Swainson’s hawk nest trees and known nest  
30           trees (occupied within 1 or more of the past 5 years) within 0.5 mile of project sites. DWR  
31           will ensure that surveys for nesting Swainson’s hawks are conducted in all suitable and  
32           known nest trees identified by the CDFW-approved biologist(s) and are consistent with the  
33           *Recommended Timing and Methodology for Swainson’s Hawk Nesting Surveys in California’s*  
34           *Central Valley* (Swainson’s Hawk Technical Advisory Committee 2000), or methodology  
35           modified with written approval from CDFW. DWR will provide survey results to CDFW by  
36           phone or email no less than 5 days prior to commencement of construction activities, and in  
37           a written report within 30 days after commencement of construction activities. The CDFW-

- 1 approved biologist(s) will include the location of all known and occupied nest trees  
2 (occupied in 1 or more of the last 5 years) present within 0.5 mile of the construction  
3 footprint. A nest tree will be considered occupied from the time the Swainson's hawk pair  
4 starts constructing the nest until the young leave the nest, or until the CDFW-approved  
5 biologist(s) determine(s) the nesting attempt failed and the nest is abandoned.
- 6 2. Timing Restrictions. Where the construction site occurs within 0.5 mile of known or  
7 occupied nest trees identified by the CDFW-approved biologist(s), DWR will limit  
8 construction activities to outside the Swainson's hawk breeding season (March 1 through  
9 August 15), to the extent practicable. Where construction activities cannot be restricted to  
10 more than 0.5 mile of an occupied nest tree during the breeding season, DWR will restrict  
11 the construction activities to not occur during the period of egg laying until after young have  
12 fledged, as determined by the CDFW-approved biologist(s), to the extent practicable. If not  
13 practicable, DWR will initiate construction activities prior to egg laying to allow time for  
14 Swainson's hawk acclimate to disturbance before eggs are laid. Where restricting work to  
15 outside the breeding season or during the period of egg laying to post-fledging is not  
16 practicable, DWR will submit plans to initiate construction activities to CDFW for written  
17 approval.
- 18 3. No-Disturbance Buffer. Where construction activities must occur within 0.5 mile of an  
19 occupied Swainson's hawk nest tree, DWR will establish a 650-foot-radius no-activity buffer  
20 (buffer) around each occupied nest tree, and the buffer will remain in place until the end of  
21 the breeding season or until the last chick has left the nest. DWR will clearly delineate the  
22 buffer with fencing or other conspicuous marking. The CDFW-approved biologist(s) will  
23 monitor occupied nest trees to track progress of nesting activities (see *Swainson's Hawk*  
24 *Nest Monitoring*, below). DWR will not conduct any construction activities within the buffer  
25 unless a smaller buffer is approved in writing by CDFW. If a construction activity must occur  
26 within 0.5 miles of an occupied nest tree, DWR will follow the conditions under *Swainson's*  
27 *Hawk Nest Monitoring* below. DWR will not conduct any construction activity within 150  
28 feet of an occupied nest tree.
- 29 4. Swainson's Hawk Nest Monitoring. Where construction activities must occur within 0.5 mile  
30 of an occupied Swainson's hawk nest tree, DWR will implement the following monitoring  
31 plan. If a nesting bird monitoring and management plan is prepared by a CDFW-approved  
32 biologist, and approved in writing by CDFW, it will prevail where it differs from the  
33 measures below.
- 34 a. Five days and three days prior to the initiation of construction at any site where an  
35 occupied nest is within 0.5 mile of construction, the CDFW-approved biologist will  
36 observe the subject nest(s) for at least one hour or until nest status can be determined.  
37 The CDFW-approved biologist(s) will document nesting status and behaviors to  
38 compare to nesting status and behaviors after construction begins. DWR will report the  
39 results of preconstruction monitoring to CDFW within 24 hours of each survey.
- 40 b. Where an occupied nest tree occurs between 150 and 325 feet (46 to 99 meters) from  
41 construction activities, the CDFW-approved biologist will observe the nest for at least 4  
42 hours per day during construction to ensure the Swainson's hawks are engaged in  
43 normal nesting behavior. DWR will limit construction to between 30 minutes after  
44 sunrise and 30 minutes before sunset.

- 1 c. Where an occupied nest tree occurs between 325 and 650 feet (99 to 198 meters) of  
2 construction, the CDFW-approved biologist(s) will observe the nest for at least 2 hours  
3 per day during construction to ensure the Swainson's hawk are engaged in normal  
4 nesting behavior.
- 5 d. Where an occupied nest tree occurs between 650 and 1,300 feet (198 to 396 meters) of  
6 construction, the CDFW-approved biologist(s) will observe the nest for at least one hour  
7 on at least three days per week during construction to ensure the Swainson's hawk are  
8 engaged in normal nesting behavior and to check the status of the nest.
- 9 e. Where an occupied nest tree occurs between 1,300 and 2,640 feet (396 to 805 meters)  
10 of construction, the CDFW-approved biologist(s) will observe the nest for at least one  
11 hour on at least one day per week during construction to ensure the Swainson's hawks  
12 are engaged in normal nesting behavior and to check the status of the nest.
- 13 5. Disturbance of Occupied Nest Tree. DWR will prohibit physical contact with an occupied  
14 nest tree throughout the breeding season (March 1 through August 15). All workers within  
15 650 feet will be out of the line of sight of the occupied nest tree during breaks or will take  
16 breaks more than 650 feet from the occupied nest tree.
- 17 6. Authority of CDFW-Approved biologist(s). If, during construction, the CDFW-approved  
18 biologist(s) determine(s) that a nesting Swainson's hawk within 0.5 mile of the construction  
19 site is disturbed by construction activities to the point where nest abandonment is likely, the  
20 CDFW-approved biologist(s) will have the authority to immediately stop work and will  
21 immediately notify DWR. A designated representative from DWR will contact CDFW within  
22 24 hours to determine additional protective measures to be implemented. The CDFW-  
23 approved biologist(s) will:
- 24 a. Stop construction until additional protective measures are implemented, unless  
25 Swainson's hawk behavior normalizes on its own. Potential nest abandonment and  
26 failure may be indicated if, in the CDFW-approved biologist(s) professional judgment,  
27 the Swainson's hawks exhibit distress and/or abnormal nesting behavior, such as  
28 swooping/ stooping at equipment or personnel, excessive distress-call vocalization or  
29 agitated behavior directed at personnel, failure to remain on nest, or failure to deliver  
30 prey items.
- 31 b. Continue monitoring and ensure additional protective measures remain in place until  
32 the CDFW-approved biologist(s) determine(s) Swainson's hawk behavior has  
33 normalized.
- 34 c. Determine if additional protective measures are ineffective and stop construction until  
35 the additional protective measures are modified.
- 36 d. Continue monitoring until determining that Swainson's hawk behavior has normalized.
- 37 e. The DWR representative or CDFW-approved biologist(s) will notify CDFW within 24  
38 hours if nests or nestlings are abandoned and if the nestlings are still alive. The CDFW-  
39 approved biologist(s) will work with CDFW to determine appropriate actions.
- 40 7. Nest Tree Avoidance. DWR will avoid removal of known nest trees and suitable nest trees to  
41 the maximum extent practicable. If a known nest tree must be removed for construction  
42 activities, DWR will notify and obtain written approval from CDFW. The notification will  
43 include the location of the known nest tree, conditions to offset the loss of the nest tree, and

- 1 the time of removal, which will generally be October 1 through February 1. DWR will not  
2 remove any occupied nest tree until the last young have left the nest, as verified by the  
3 CDFW-approved biologist(s).
- 4 8. Geotechnical Exploration. DWR will conduct geotechnical exploration outside of the  
5 breeding season, to the extent practicable. The CDFW-approved biologist(s) will delineate  
6 with flagging or other visible markers suitable breeding habitat within the geotechnical  
7 exploration site. DWR will restrict geotechnical exploration to areas outside of the  
8 delineated breeding habitat. If geotechnical exploration must occur during the breeding  
9 season, the CDFW-approved biologist(s) will survey the breeding habitat within 0.5 mile for  
10 nesting Swainson's hawks. DWR will limit geotechnical exploration activities to least 0.5  
11 mile away from any occupied nest tree, unless otherwise approved by CDFW.
- 12 9. Measures Specific to Transmission Line Construction. DWR will not use helicopters to string  
13 transmission lines or to conduct surveys for field investigations within 0.5 mile of an  
14 occupied nest tree. DWR will not remove or trim occupied nest trees for transmission line  
15 construction until after the breeding season has ended or the last young have left the nest. If  
16 removal or trimming of an occupied nest tree needs to occur for human or wildlife safety,  
17 DWR will conduct removal or trimming from October 1 to February 1 (outside of the  
18 breeding season), or with written approval and guidance from CDFW. DWR will avoid  
19 removal or trimming of known or suitable nest trees, to the extent practicable, during  
20 transmission line stringing and reconductoring activities or during power and pole  
21 placement. Where practicable, DWR will place poles and lines outside of breeding habitat, as  
22 delineated by the CDFW-approved biologist(s). DWR will follow the *Nest Tree Avoidance*  
23 measures listed above when removal or trimming of known or suitable nest trees cannot be  
24 avoided.

## 25 ***Mitigation Impacts***

26 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
27 mitigation measure impacts. The analyses below consider the potential impacts associated with  
28 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
29 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
30 *Measures*.

## 31 *Compensatory Mitigation*

32 The creation and enhancement of wetlands as well as habitat for special-status species under the  
33 project's CMP would affect Swainson's hawk through the permanent and temporary loss of nesting  
34 and foraging habitat (Appendix 13C) from vegetation removal and grading to create the appropriate  
35 topography and soil conditions to establish or restore habitats.

36 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
37 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
38 vernal pool complexes, alkaline seasonal wetlands, or grasslands are located, and could result in the  
39 temporary disturbance of existing Swainson's hawk foraging habitat. Foraging Swainson's hawks  
40 are highly mobile and would avoid direct injury or mortality from slow-moving or stationary  
41 construction equipment. Furthermore, Swainson's hawks frequently forage in the vicinity of  
42 operating farm equipment, therefore the presence of construction equipment and its associated

1 noise is not expected to disrupt Swainson's hawk foraging behavior. Site-specific analyses are not  
2 provided because locations of potential non-bank sites are not currently known.

3 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
4 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
5 management of agricultural areas but may also include natural communities in the study area  
6 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
7 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
8 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
9 CMP-22b: *Tricolored Blackbird Foraging Habitat*). Conversion and management of agricultural lands  
10 would provide foraging habitat of equal or greater habitat value for Swainson's hawk and would  
11 maintain these lands in non-permanent crop types in perpetuity. Crop rotations, and related  
12 management activities would be conducted under a similar disturbance regime that the species  
13 would encounter under existing conditions. Grassland enhancement activities could also create  
14 temporary disturbances of the foraging habitat for the species. Nesting habitat creation could result  
15 in the disruption of normal behaviors, injury, or mortality if conducted adjacent to active nest sites.  
16 Site-specific analyses are not provided because locations of potential protection instruments are not  
17 currently known.

18 The CMP and site-specific permitting approvals would account for any losses of Swainson's hawk  
19 nesting and foraging habitat from habitat creation by adjusting the overall commitment of riparian  
20 creation (Appendix 3F, Section 3F.1, Section 3F.2.4, Attachment 3F.1, Table 3F.1-3, CMP-0: *General*  
21 *Design Guidelines*) and therefore reduce any habitat losses associated with the CMP to less than  
22 significant. The creation and enhancement activities would also have the potential for injury,  
23 mortality, and the disruption of normal behaviors of individuals if they were to nest in the vicinity of  
24 restoration activities. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2:  
25 *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
26 *Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14:  
27 *Construction Best Management Practices for Biological Resources* (Appendix 3B) and Mitigation  
28 Measure BIO-39: *Conduct Preconstruction Surveys and Implement Protective Measures to Minimize*  
29 *Disturbance of Swainson's Hawk* would reduce the potential for injury, mortality, and the disruption  
30 of normal behaviors of individuals to less than significant. These impacts would be less than  
31 significant with mitigation because the aforementioned measures would (1) train construction staff  
32 on protecting Swainson's hawks and their nests, the requirements for avoiding impacts, and the  
33 ramifications for not following these measures; (2) minimize dust; (3) implement spill prevention  
34 and containment plans that would avoid material spills that could affect habitat; (4) prior to and  
35 during implementing restoration and enhancement ground disturbance, establish protective buffers  
36 around occupied nest sites; and (5) have a biological monitor present that would ensure that non-  
37 disturbance buffers are intact and all protective measures are being implemented where applicable.  
38 The impact on Swainson's hawk from the project with the CMP would be less than significant with  
39 mitigation.

#### 40 Other Mitigation Measures

41 Some mitigation measures would involve ground disturbance, the use of heavy equipment, pile  
42 driving, or pesticides that would have the potential to expose Swainson's hawk to excessive noise,  
43 visual disturbance, dust, and hazardous materials that could cause loss of modeled habitat,  
44 disruption of normal behaviors, and injury or mortality. The mitigation measures with potential to  
45 result in impacts on Swainson's hawk are similar to those discussed under Impact BIO-31: *Impacts*

1 *of the Project on Western Yellow-Billed Cuckoo*. Impacts on Swainson's hawk resulting from  
2 implementation of mitigation measures would be similar to construction effects of the project  
3 alternatives in certain construction areas and would contribute to Swainson's hawk impacts of the  
4 project alternatives.

5 The impacts of habitat loss, noise, visual disturbance, and exposure to dust or hazardous materials  
6 on Swainson's hawk would be reduced through the CMP, environmental commitments, and  
7 Mitigation Measure NOI-1: *Develop and Implement a Noise Control Plan* as detailed under Impact  
8 BIO-31: *Impacts of the Project on Western Yellow-Billed Cuckoo*. In addition, Mitigation Measure BIO-  
9 39: *Conduct Preconstruction Surveys and Implement Protective Measures to Minimize Disturbance of*  
10 *Swainson's Hawk* would require species-specific measures to reduce these impacts. Therefore,  
11 impacts on Swainson's hawk from implementation of other mitigation measures would be reduced  
12 to less than significant.

13 Overall, the impacts on Swainson's hawk from construction of compensatory mitigation and  
14 implementation of other mitigation measures, combined with project alternatives, would not change  
15 the impact conclusion of less than significant with mitigation.

#### 16 **Impact BIO-40: Impacts of the Project on Burrowing Owl**

17 The methods for the analysis of effects on burrowing owl appear in Section 13.3.1.1, and information  
18 on the species life history and habitat suitability model are presented in the species account  
19 Appendix 13B, Section 13B.74, *Burrowing Owl*.

#### 20 ***All Project Alternatives***

##### 21 *Construction*

22 The construction of all project alternatives would affect modeled habitat for burrowing owl.  
23 Construction-related effects would include the permanent and temporary loss of habitat, and the  
24 potential injury or mortality of individual owls and eggs, as well as nest abandonment. The loss of  
25 burrowing owl habitat would primarily occur as a result of construction of the Southern Forebay  
26 (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and the placement of RTM conveyor and handling  
27 facilities at the Twin Cities Complex (all alternatives), on Bouldin Island (Alternatives 1, 2a, 2b, and  
28 2c), and on Lower Roberts Island (Alternatives 3, 4a, 4b, 4c, and 5; Appendix 13C). The majority of  
29 these impacts would occur on cultivated lands, which provide low-value habitat for burrowing owl.  
30 High- and low-value habitat would also be affected by the construction of new transmission lines to  
31 power the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c). The central alignment  
32 alternatives (Alternatives 1, 2a, 2b, and 2c) would result in greater impacts on modeled habitat  
33 compared to the eastern alternatives (Alternatives 3, 4a, 4b, and 4c) and Bethany Reservoir  
34 alignment alternative (Alternative 5) largely because of levee improvements on Bouldin Island,  
35 which would primarily affect high-value burrowing owl habitat. The Bethany Reservoir alternative  
36 (Alternative 5) would also result in impacts on both high- and low-value habitat from the  
37 construction of the Bethany Complex and associated access roads (Appendix 13C). Acres of  
38 permanent and temporary impacts on modeled habitat for burrowing owl are shown in Table 13-82.  
39 Environmental Commitment EC-14: *Construction Best Management Practices for Special-Status*  
40 *Species* would ensure that temporarily disturbed areas are restored (Appendix 3B).

1 **Table 13-82. Impacts on Modeled Habitat for Burrowing Owl by Alternative**

Alternative	Permanent Impacts— High Value (acres) <sup>a</sup>	Permanent Impacts— Low Value (acres) <sup>a</sup>	Temporary Impacts— High Value (acres)	Temporary Impacts— Low Value (acres)	Total (acres)
1	983.62	2,154.09	183.77	212.90	3,534.38
2a	1,108.43	2,321.58	199.65	239.09	3,868.75
2b	873.79	1,917.47	196.69	233.19	3,221.14
2c	923.33	2,051.73	199.16	238.93	3,413.15
3	757.13	2,039.88	152.04	173.32	3,122.37
4a	898.11	2,255.59	153.69	173.90	3,481.29
4b	663.18	1,790.34	150.66	168.06	2,772.24
4c	713.00	1,945.46	153.14	173.77	2,985.37
5	519.41	1,263.62	60.87	117.32	1,961.22

<sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see discussion in Section 13.3.1.2.

5 Ground disturbance and construction vehicles could injure or kill burrowing owls by crushing  
6 occupied burrows or collapsing burrow entrances, trapping any owls inside. Burrowing owls are  
7 moderately maneuverable and foraging owls outside of their burrows would be able to avoid direct  
8 injury or mortality from slow-moving or stationary construction equipment.

9 Although some burrowing owls in urban and agricultural landscapes appear relatively tolerant of  
10 human disturbance (Poulin et al. 2020), it is difficult to predict how and at what distance a given  
11 nesting pair would react to noise and vibration. Consequently, it is possible that construction-  
12 generated noise and vibration near nest burrows could cause adult owls to abandon eggs or recently  
13 hatched young, or cause wintering owls to abandon their burrows, leaving them vulnerable to  
14 predation. Increased noise from construction could also mask sounds made by prey, especially if the  
15 sounds are in the high frequency range (Scobie et al. 2016:84–85). Artificial sounds with low to mid  
16 frequencies may affect an owl's ability to attract a mate (males produce low frequency songs during  
17 mating season) or communicate warning calls to mates or young (Scobie et al. 2016:85). Increased  
18 cover of tall, invasive weeds in temporarily disturbed areas could reduce habitat suitability for  
19 burrowing owls because they prefer areas with short, sparse vegetation (California Department of  
20 Fish and Game 2012:20). Construction-related lighting could reduce prey availability to burrowing  
21 owls, as prey may remain closer to cover to avoid detection. Predation risk to burrowing owls could  
22 also increase due to artificial lighting, because they may be more visible to predators (Scobie et al.  
23 2016:76). All lights used during nighttime construction would be downcast, cut-off type fixtures  
24 with non-glare finishes, natural light qualities, and minimum intensity. Construction-related lighting  
25 would be shielded and oriented in such a manner so as not to subject the immediate surroundings to  
26 extremes in the levels of light, however, these types of light generate an ambient nighttime  
27 luminescence that is visible from a distance. Effects of construction-related light would be greater at  
28 the intakes where existing conditions are dark and rural in comparison with the Twin Cities  
29 Complex, Southern Complex, and Bethany Complex where there are existing sources of light that  
30 may illuminate suitable habitat. Construction activities could expose burrowing owl to dust if  
31 present in or adjacent to work areas and the discharge of construction-related fluids could also  
32 affect the species and its habitat. Environmental Commitments EC-1: *Conduct Worker Awareness*

1        *Training; EC-2: Develop and Implement Hazardous Materials Management Plans; EC-3: Develop and*  
2        *Implement Spill Prevention, Containment, and Countermeasure Plans; EC-11: Fugitive Dust Control;*  
3        *and EC-14: Construction Best Management Practices for Biological Resources (Appendix 3B) would*  
4        reduce these potential impacts by (1) training construction staff on protecting breeding and  
5        wintering burrowing owls, reporting requirements, and the ramifications for not following these  
6        measures; (2) implementing spill prevention and containment plans that would avoid material spills  
7        that could affect suitable habitat; and (3) having a biological monitor present that would ensure that  
8        non-disturbance buffers are intact and all protective measures are being implemented, where  
9        applicable.

10       Two CNDDDB occurrences for burrowing owl are located within proposed road improvement areas  
11       and a temporary rail right-of-way (occurrences #49 and #612, Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b,  
12       4c) just west of Clifton Court Forebay (California Department of Fish and Wildlife 2020a). One  
13       CNDDDB occurrence overlaps with a subsurface SCADA fiber route alignment (occurrence #207,  
14       Alternative 5) and one CNDDDB occurrence overlaps with the footprint of the Bethany Complex  
15       (occurrence #478, Alternative 5). Many other burrowing owl occurrences (California Department of  
16       Fish and Wildlife 2020a; California Department of Water Resources 2011) have been recorded in the  
17       vicinity of Southern Forebay and associated features (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and  
18       in the vicinity of the Bethany Complex and associated access roads under the Bethany Reservoir  
19       alignment (Alternative 5).

20       Field investigations would be conducted prior to and during construction under all alternatives to  
21       more specifically identify appropriate construction methods and design criteria addressed in the  
22       final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
23       and address the establishment of geological and groundwater monitoring programs (Delta  
24       Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
25       variety of ground-disturbing activities that would vary in duration from several hours to  
26       approximately 6 weeks (Section 3.15; Delta Conveyance Design and Construction Authority 2022a,  
27       2022b) and could result in impacts on habitat and the potential for injury, mortality, and the  
28       disruption of normal behaviors of burrowing owl. Geotechnical investigations that would occur in  
29       the West Tracy Fault Study area, and over the tunnel alignment footprints which include test  
30       trenches, CPTs, soil borings, and geophysical arrays, would result in impacts on both high- and low-  
31       value modeled burrowing owl habitat (Appendix 13C). The Bethany Fault Study geotechnical  
32       investigations (Alternative 5) would be completed in a single day and would involve placing  
33       approximately 20 ERT probes 0.5 inch in diameter. The study would be conducted entirely on foot,  
34       perpendicular to the tunneled portion of the Bethany Reservoir Aqueduct (Delta Conveyance Design  
35       and Construction Authority 2022a, 2022b). The Bethany Fault Study could result in minor  
36       disruption of normal behaviors, but because of its small footprint and the short (1-day) duration of  
37       the disturbance, impacts on modeled habitat are not quantified and are considered negligible. The  
38       following field investigations would be conducted within proposed surface construction footprints  
39       of project facilities (including portions of tunnel alignments) and would temporarily affect habitat:  
40       test trenches, CPTs, soil borings, ERT, groundwater testing and monitoring, monument installation,  
41       pilot studies for settlement, agronomic testing, and utility potholing. These temporary impacts are  
42       not characterized as an additional loss of habitat because impacts for these locations have already  
43       been quantified within the construction-related footprints but could still result in the potential for  
44       injury, mortality, and disruption of normal behaviors of burrowing owl if present in the vicinity, as  
45       discussed above for conveyance facility construction. Environmental Commitments EC-1: *Conduct*  
46       *Worker Awareness Training; EC-2: Develop and Implement Hazardous Materials Management Plans;*



1 EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
2 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these  
3 potential impacts by (1) training construction staff on protecting wintering and breeding burrowing  
4 owls, reporting requirements, and the ramifications for not following these measures; (2)  
5 implementing spill prevention and containment plans that would avoid material spills that could  
6 affect suitable habitat; and (3) having a biological monitor present that would ensure that non-  
7 disturbance buffers are intact and all protective measures are being implemented, where applicable.  
8 Noise and visual disturbances from helicopter surveys to identify buried groundwater and natural  
9 gas wells throughout the project area and pile installation test methods at the north Delta intakes  
10 may also cause disturbance to burrowing owls, as described above under construction-related  
11 effects.

## 12 Operations

13 The operation of project facilities would not require ground disturbance or result in additional  
14 habitat loss, but project operations would generate small levels of noise, have permanent light  
15 sources, and require the periodic presence of staff and vehicle traffic. Noise from the operation of  
16 the water conveyance facilities would not be discernably higher than existing conditions (Chapter  
17 24, Section 24.4.3.2). Permanent facility lighting associated with project facilities under all  
18 alternatives could extend into burrowing owl habitat, which could affect the behavior of individuals,  
19 as described above under construction-related effects; however, as stated in Chapter 3, Section  
20 3.4.12, permanent lighting at project facilities would be motion activated, downcast, cut-off type  
21 fixtures with non-glare finishes, and therefore permanent facilities would remain dark the majority  
22 of the time at night, which would minimize the potential for this impact. Burrowing owls are  
23 susceptible to vehicle collisions (Gervais et al. 2008:222) and the periodic presence of staff-related  
24 vehicle traffic would pose a risk of injury or mortality to individuals if vehicle speed were not  
25 restricted.

26 Power for construction and operation of the conveyance facilities has been designed to use existing  
27 power lines and underground conduit to the extent feasible under all project alternatives. Most new  
28 project lines would be placed on existing poles and towers and therefore would not substantially  
29 alter the existing landscape. However, new aboveground high-voltage transmission and SCADA lines  
30 would be constructed to power the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c)  
31 and the Bethany Complex under Alternative 5 (Chapter 3, Figure 3-13 and Figure 3-14). Burrowing  
32 owls forage throughout the day but are largely crepuscular, hunting mostly at dusk and dawn.  
33 Hunting in low light can be a risk factor for power line collision. However, owls have acute eyesight  
34 adapted to low-light conditions and a wide range of vision. In addition, the species feeds primarily  
35 on the ground where it catches insects by walking and hopping or catching from burrow mound or  
36 perch (Polite 1999:1). Burrowing owls may hunt vertebrates from both perch and by hovering low  
37 to the ground. Hunting typically occurs at about 33 feet above ground (Poulin et al. 2020), keeping  
38 the owl below the height of the proposed new project transmission lines. The species is large-bodied  
39 but with relatively long and rounded wings, making it moderately maneuverable. While burrowing  
40 owls may nest in loose colonies, they do not flock or congregate in roosts or foraging groups.  
41 Collectively, the species' keen eyesight and largely ground-based hunting behavior make it a  
42 relatively low-risk species for power line collision. Transmission line poles and towers also provide  
43 perching substrate for raptors, which are predators on burrowing owls. The existing network of  
44 transmission lines in the study area currently poses these risks and any incremental risk associated  
45 with the new power line corridors would not be expected to affect the study area population.

1 Current use and legacy pesticides have the potential to bioaccumulate in the food items of  
2 burrowing owls. Operation of all project alternatives and potential runoff from project facilities  
3 would not result in substantial increases in pesticide concentrations in Delta waters or in Delta  
4 outflows and would not result in land-use changes that would increase use of pesticides, relative to  
5 existing conditions. Therefore, the project alternatives would not substantially reduce prey  
6 populations or increase pesticide exposure to burrowing owl.

### 7 Maintenance

8 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
9 in periodic disturbances that could affect burrowing owl. Maintenance activities across all facilities  
10 that could affect burrowing owl (all alternatives) include repaving of access roads every 15 years,  
11 semiannual general and ground maintenance (e.g., mowing, vegetation trimming, herbicide  
12 application), and daily or weekly inspections by vehicle. Maintenance activities at launch, reception,  
13 and maintenance shafts along the central alignment (Alternatives 1, 2a, 2b, and 2c), eastern  
14 alignment (Alternatives 3, 4a, 4b, and 4c), and Bethany Reservoir alignment (Alternative 5) would  
15 include similar semiannual general and ground maintenance in addition to daily inspections by  
16 vehicle. Maintenance at the Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) would  
17 also include annual embankment repair and quarterly animal burrow filling. These maintenance  
18 activities could result in injury or mortality of burrowing owls if they are occupying burrows (during  
19 either the breeding or wintering season). Maintenance activities would generally be conducted  
20 during the day, except for emergency maintenance, and would therefore not require additional  
21 lighting. Noise effects from maintenance activities could negatively affect burrowing owls, as  
22 described above under construction-related effects.

### 23 **CEQA Conclusion—All Project Alternatives**

24 Construction, operations, and maintenance of the water conveyance facilities under all project  
25 alternatives would result in impacts on burrowing owl through the permanent and temporary loss  
26 of modeled habitat of a special-status species and the potential for injury, mortality, and the  
27 disruption of normal behaviors. For all project alternatives, changes in water operations would not  
28 be expected to result in a measurable increase in pesticide to burrowing owl.

29 The temporary impacts on habitat and potential impacts of injury, mortality, or disruption of normal  
30 behaviors from project construction, operations, and maintenance activities would be reduced by  
31 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
32 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
33 *Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best*  
34 *Management Practices for Special-Status Species* (Appendix 3B); however, even with these  
35 commitments, the impacts of the project alternatives on burrowing owl would be significant. The  
36 CMP would be required to offset the loss of burrowing owl habitat by creating and protecting  
37 grassland habitat (Appendix 3F, Section 3F.3.3.2) on Bouldin Island and the I-5 ponds, through the  
38 protection and management of agricultural foraging habitat Swainson's hawk (Appendix 3F, Section  
39 3F.3.3.2, and Attachment 3F.1, Table 3F.1-3, CMP-19b: *Swainson's Hawk Foraging Habitat*), and by  
40 mitigating for occupied burrowing owl habitat (Appendix 3F, Attachment 3F.1, Table 3F.1-3, CMP-  
41 20: *Occupied Burrowing Owl Habitat*), which would mitigate the loss of habitat to a less-than-  
42 significant level. Mitigation Measures AES-4b: *Minimize Fugitive Light from Portable Sources Used for*  
43 *Construction*; AES-4c: *Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light*  
44 *Spill from Truck Headlights toward Residences* (Chapter 18); NOI-1: *Develop and Implement a Noise*

1 *Control Plan* (Chapter 24); BIO-2b: *Avoid and Minimize Impacts on Biological Resources from*  
2 *Maintenance Activities*; BIO-2c: *Electrical Power Line Support Placement*; BIO-22b: *Avoid and*  
3 *Minimize Operational Traffic Impacts on Wildlife*; and BIO-40: *Conduct Surveys and Minimize Impacts*  
4 *on Burrowing Owl*, would avoid and minimize the potential for injury, mortality, or the disruption of  
5 normal behaviors and disturbances to habitat. The impacts on burrowing owl from the project  
6 alternatives would be less than significant with mitigation because the aforementioned measures  
7 would reduce direct effects on the species, including habitat, noise, and visual disturbances, by  
8 providing environmental awareness training to construction personnel, by implementing protective  
9 measures during maintenance activities, and avoidance measures for burrowing owl during  
10 construction.

### 11 **Mitigation Measure CMP: Compensatory Mitigation Plan**

12 The CMP (see Impact BIO-1 for a summary discussion of the CMP) would offset the loss of  
13 burrowing owl habitat by creating and protecting grassland habitat (Appendix 3F, Section  
14 3F.3.3.2) on Bouldin Island and the I-5 ponds, through the protection and management of  
15 agricultural foraging habitat Swainson's hawk (Appendix 3F, Section 3F.3.3.2, and Attachment  
16 3F.1, Table 3F.1-3, CMP-19b: *Swainson's Hawk Foraging Habitat*), and by mitigating for occupied  
17 burrowing owl habitat (Appendix 3F, Attachment 3F.1, Table 3F.1-3, CMP-20: *Occupied*  
18 *Burrowing Owl Habitat*).

### 19 **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for** 20 **Construction**

21 See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

### 22 **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary,** 23 **to Prevent Light Spill from Truck Headlights toward Residences**

24 See description of Mitigation Measure AES-4c under Impact AES-4 in Chapter 18.

### 25 **Mitigation Measure NOI-1: Develop and Implement a Noise Control Plan**

26 See description of Mitigation Measure NOI-1 under Impact NOI-1 in Chapter 24.

### 27 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 28 **Resources from Maintenance Activities**

29 See description of Mitigation Measure BIO-2b under Impact BIO-2.

### 30 **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

31 See description of Mitigation Measure BIO-2c under Impact BIO-2.

### 32 **Mitigation Measure BIO-22b: Avoid and Minimize Operational Traffic Impacts on Wildlife**

33 See description of Mitigation Measure BIO-22b under Impact BIO-22.

## 1 Mitigation Measure BIO-40: Conduct Surveys and Minimize Impacts on Burrowing Owl

### 2 *All Project Alternatives*

3 The following measures will be required to minimize impacts on burrowing owl.

#### 4 1. Surveys.

- 5 a. Burrowing owl breeding and wintering surveys will be required within 500 feet of  
6 water conveyance work areas and restoration sites where suitable habitat has been  
7 identified during habitat assessment surveys where access is available. Surveys will be  
8 initiated during the year that precedes construction and will be consistent with the  
9 methods described in the Staff Report on Burrowing Owl Mitigation (California  
10 Department of Fish and Game 2012), or a modified methodology with written approval  
11 from CDFW.
- 12 b. In addition to initial breeding and wintering season surveys, DWR will also require that  
13 preconstruction survey be conducted, with one occurring 14 days prior to  
14 groundbreaking and/or staging activities and another within 24 hours of these  
15 activities. These surveys will confirm whether owls identified during the initial breeding  
16 and wintering season surveys are still present or whether the previously unoccupied  
17 site has since become occupied by burrowing owls.

#### 18 2. Avoidance and Minimization. To the extent feasible, burrowing owls will be avoided by 19 relocating work areas with flexible locations, such as geotechnical exploration sites. Within 20 the construction footprint where ground disturbance cannot avoid burrowing owls, owls 21 will be relocated during the nonbreeding season and burrows will be excavated in 22 coordination with CDFW, as described below under *Burrowing Owl Relocation*.

- 23 a. If an active burrow is identified near a work area and work cannot be conducted outside  
24 of the nesting season (February 1 through August 31), a qualified biologist will establish  
25 a non-disturbance buffer that extends a minimum of 328 feet (200 meters) around the  
26 burrow. If burrowing owls are present at the site during the nonbreeding season  
27 (September 1 through January 31), a qualified biologist will establish a no-activity zone  
28 that extends a minimum of 656 feet (100 meters) around the burrow. The extent of non-  
29 disturbance buffers will be determined based on time of year and level of disturbance  
30 described in the *Staff Report on Burrowing Owl Mitigation* (California Department of  
31 Fish and Game 2012:9)
- 32 b. If the appropriate no-activity buffer for breeding or nonbreeding burrowing owls cannot  
33 be established, a qualified biologist will evaluate site-specific conditions and, in  
34 consultation with CDFW, recommend a smaller buffer that still minimizes the potential  
35 to disturb the owls (and still allows reproductive success during the breeding season).  
36 The site-specific buffer will be established by taking into consideration the type and  
37 extent of the proposed activity occurring near the occupied burrow, the duration and  
38 timing of the activity, the sensitivity and habituation of the owls to existing conditions,  
39 and the dissimilarity of the proposed activity to background activities. If an appropriate  
40 buffer cannot be established around the active owl burrows, actions will be taken to  
41 exclude the owls from the site per the requirements below.
- 42 c. A biological monitor will be present during all construction activities occurring within  
43 any reduced buffers. If during the breeding season there is any change in owl nesting

1 and foraging behavior as a result of construction activities, the biological monitor will  
2 have the authority to immediately stop work and will work with construction personnel  
3 and the environmental manager to provide additional protections to reduce  
4 disturbance, such as adding visual and sound curtains; any modifications to the  
5 standard protections will be in consultation with CDFW.

- 6 d. If monitoring indicates that the nest is abandoned prior to the end of nesting season or  
7 the burrow is no longer in use by owls (e.g., chicks have fledged), the no-activity buffer  
8 may be removed. If the burrow cannot be avoided by construction activity, the biologist  
9 will excavate and collapse the burrow to prevent reoccupation.

- 10 3. Burrowing Owl Relocation. No relocation of burrowing owls will occur during the breeding  
11 season. If burrowing owls are present within the construction footprint and cannot be  
12 avoided during the nonbreeding season (generally September 1 through January 31), they  
13 will be relocated through passive relocation, with or without burrow exclusion. Burrow  
14 exclusion is the prevention of burrows being re-occupied through the use of one-way doors.  
15 Passive relocation will be used when (1) there is a sufficient amount of suitable habitat  
16 adjacent to the work area to support nesting and foraging, (2) there are compatible land use  
17 practices in the area, and (3) the area is preferably currently under or proposed for  
18 conservation. Passive relocation will be conducted during the nonbreeding season; however,  
19 passive relocation techniques may be used during the breeding season (February 1 through  
20 August 31) if a qualified biologist, coordinating with CDFW, determines through site  
21 surveillance that the burrow is not occupied by a breeding pair, young, or eggs. To the extent  
22 feasible, passive relocation will first be considered without the use of exclusion devices in  
23 order to avoid and minimize harassment of owls. DWR will develop Burrowing Owl Artificial  
24 Burrow and Exclusions Plans to be approved by CDFW prior to relocation activities.

- 25 a. Passive relocation without exclusion. Prior to relocating owls, all potential burrowing  
26 owl burrows in suitable nesting habitat and within the project footprint and 75 feet (23  
27 meters) around the footprint, will be surveyed for owl use, and excavated if no owls are  
28 found. If occupied burrows are found, two natural or artificial burrows will be provided  
29 for each occupied burrow, within 165 to 325 feet (50 to 99 meters) of the natural  
30 burrow where feasible. Artificial burrows will be installed following the methods in  
31 Barclay (2008:53–55) and Johnson et al. (2010:4–32), or more current methodology if it  
32 becomes available, upon CDFW approval. Sites used for artificial burrows will either be  
33 properties currently used for or proposed for conservation if feasible. After constructing  
34 the artificial burrows, the owls will be given 60 days to relocate on their own. The work  
35 area will be monitored weekly for up to 60 days to determine whether the owls have left  
36 the burrow and to confirm occupancy at the artificial or other nearby burrows. The  
37 formerly occupied burrows will then be excavated. Whenever feasible, burrows will be  
38 excavated using hand tools and refilled to prevent reoccupation. Sections of flexible  
39 plastic pipe (at least 3 inches in diameter) will be inserted into burrows during  
40 excavation to maintain an escape route for any animals inside the burrow.

- 41 b. Passive relocation with exclusion. If the burrowing owls found do not relocate on their  
42 own through the above methodology, passive relocation will be accomplished by  
43 installing one-way doors (e.g., modified dryer vents). The one-way doors will be left in  
44 place for a minimum of 48 hours and be monitored twice daily to ensure that the owls  
45 have left the burrow. The burrow will be excavated using hand tools, and a section of  
46 flexible plastic pipe (at least 3 inches in diameter) will be inserted into the burrow

1 tunnel during excavation to maintain an escape route for any animals that may be inside  
2 the burrow.

### 3 ***Mitigation Impacts***

4 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
5 mitigation measure impacts. The analyses below consider the potential impacts associated with  
6 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
7 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
8 *Measures*.

#### 9 *Compensatory Mitigation*

10 The creation and enhancement of wetlands as well as habitat for special-status species under the  
11 project's CMP would affect burrowing owl through the permanent and temporary loss of habitat  
12 (Appendix 13C), from vegetation removal and grading to create the appropriate topography and soil  
13 conditions to establish or restore habitats.

14 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
15 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
16 vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located, which could  
17 support suitable burrowing owl habitat and could result in the disruption of normal behaviors,  
18 injury, or mortality of individuals. Site-specific analyses are not provided because locations of  
19 potential non-bank sites are not currently known.

20 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
21 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
22 management of agricultural areas but may also include natural communities in the study area  
23 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
24 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
25 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
26 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could potentially contain suitable  
27 burrowing owl habitat and management activities could affect this habitat and result in the  
28 disruption of normal behaviors, injury, or mortality. Site-specific analyses are not provided because  
29 locations of potential protection instruments are not currently known.

30 The CMP and site-specific permitting approvals would account for any losses of burrowing owl  
31 habitat from habitat creation by adjusting the overall commitment of riparian creation (Appendix  
32 3F, Section 3F.1, Section 3F.2.4, Attachment 3F.1, Table 3F.1-3, CMP-0: *General Design Guidelines*)  
33 and therefore reduce any habitat losses associated with the CMP to less than significant. The  
34 creation and enhancement activities would also have the potential for injury, mortality, and the  
35 disruption of normal behaviors of individuals if restoration activities occur during the breeding  
36 season (February 1 through August 31) or in the vicinity of occupied burrows (in both the breeding  
37 and wintering season), as described above under construction-related effects. Environmental  
38 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
39 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
40 *Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best Management*  
41 *Practices for Biological Resources* (Appendix 3B); and Mitigation Measure BIO-40: *Conduct Surveys*  
42 *and Minimize Impacts on Burrowing Owl* would reduce the potential for injury, mortality, and the  
43 disruption of normal behaviors of individuals to less than significant. These impacts would be less

1 than significant with mitigation because the aforementioned measures would (1) train construction  
2 staff on protecting breeding and wintering burrowing owls, the requirements for avoiding impacts,  
3 and the ramifications for not following these measures; (2) minimize dust; (3) implement spill  
4 prevention and containment plans that would avoid material spills that could affect habitat; (4)  
5 prior to and during implementing restoration and enhancement ground disturbance, identify  
6 burrowing owl habitat and establish protective buffers around burrows; and (5) have a biological  
7 monitor present that would ensure that non-disturbance buffers are intact and all protective  
8 measures are being implemented where applicable.

9 Herbicides would be applied at CMP creation and enhancement sites to remove nonnative  
10 vegetation for site preparation and to support establishment of new plantings. Natural habitats  
11 contribute fewer pesticides to receiving waters than agricultural areas where pesticides are applied.  
12 Any newly created wetlands or enhanced natural habitat could also filter stormwater to remove  
13 solids and either improve or have no effect on pesticide concentrations in discharges to receiving  
14 waters, relative to existing conditions. As such, restoration areas are expected to somewhat reduce,  
15 rather than increase, runoff of pesticides in adjacent waterbodies. Environmental Commitment EC-  
16 14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would ensure  
17 that herbicides would be applied in such a manner as to prevent primary or secondary poisoning of  
18 burrowing owl. The impact on burrowing owl from the project with the CMP would be less than  
19 significant with mitigation.

#### 20 Other Mitigation Measures

21 Some mitigation measures would involve ground disturbance, the use of heavy equipment, pile  
22 driving, or pesticides that would have the potential to expose burrowing owl to excessive noise,  
23 visual disturbance, dust, and hazardous materials that could cause loss of modeled habitat,  
24 disruption of normal behaviors, and injury or mortality. The mitigation measures with potential to  
25 result in impacts on burrowing owl are similar to those discussed under Impact BIO-31: *Impacts of*  
26 *the Project on Western Yellow-Billed Cuckoo*. Impacts on burrowing owl resulting from  
27 implementation of mitigation measures would be similar to construction effects of the project  
28 alternatives in certain construction areas and would contribute to burrowing owl impacts of the  
29 project alternatives.

30 The impacts of habitat loss, noise, visual disturbance, and exposure to dust or hazardous materials  
31 on burrowing owl would be reduced through the CMP, environmental commitments, and Mitigation  
32 Measure NOI-1: *Develop and Implement a Noise Control Plan* as detailed under Impact BIO-31:  
33 *Impacts of the Project on Western Yellow-Billed Cuckoo*. In addition, Mitigation Measure BIO-40:  
34 *Conduct Surveys and Minimize Impacts on Burrowing Owl* would require species-specific measures to  
35 reduce these impacts. Therefore, impacts on burrowing owl from implementation of other  
36 mitigation measures would be reduced to less than significant.

37 Overall, the impacts on burrowing owl from construction of compensatory mitigation and  
38 implementation of other mitigation measures, combined with project alternatives, would not change  
39 the impact conclusion of less than significant with mitigation.

#### 40 **Impact BIO-41: Impacts of the Project on Other Nesting Special-Status and Non-Special-Status** 41 **Birds**

42 The methods for the analysis of effects on other nesting special-status and non-special-status birds  
43 appear in Section 13.3.1.1. Information on the species' life histories and habitat suitability models

1 that were developed for special-status birds with the potential to nest in the study area are  
2 presented in the following species accounts in Appendix 13B: Section 13B.62, *Least Bittern*, Section  
3 13B.76, *Loggerhead Shrike*, Section 13B.81, *Modesto Song Sparrow*, Section 13B.83, *Yellow-Breasted*  
4 *Chat*, Section 13B.84, *Yellow-Headed Blackbird*, and Section 13B.87, *Yellow Warbler*. The impact  
5 analysis for bank swallow relies on the information in the species account rather than a habitat  
6 suitability model, as described in Appendix 13B, Section 13B.79, *Bank Swallow*.

## 7 ***All Project Alternatives***

### 8 *Construction*

9 The construction of all project alternatives would affect special-status and non-special-status birds.  
10 Construction effects would include the permanent and temporary loss of modeled habitat, habitat  
11 fragmentation, and the potential for the disruption of normal behaviors, injury, and mortality.

12 Modesto song sparrow and yellow-breasted chat may nest and forage in riparian shrubs and  
13 woodlands (Appendix 13B, Sections 13B.81 and 13B.83). Loggerhead shrike may nest in shrubs and  
14 trees in more open portions of the study area such as grasslands (Appendix 13B, Section 13B.76).  
15 Least bittern, Modesto song sparrow, and yellow-headed blackbird may nest in emergent wetland  
16 vegetation (Appendix 13B, Sections 13B.62, 13B.81, and 13B.84). Numerous non-special-status  
17 birds also may nest in these areas. Yellow warbler and bank swallow are not known to nest in the  
18 study area (Appendix 13B, Sections 13B.87 and 13B.79); however, individuals migrate through the  
19 region (eBird 2021). Based on a review of aerial imagery, there is no suitable bank swallow nesting  
20 habitat (i.e., alluvial soils that form steep, eroded banks that have not been stabilized with levee  
21 revetment) within or adjacent to the construction footprint for any project alternatives. RTM  
22 storage areas are not expected to be colonized by nesting bank swallows, as it is unlikely that the  
23 substrate would provide suitable nesting habitat for the species. However, RTM sites could become  
24 suitable for swallows over time, as the substrate stabilizes.

25 The removal of riparian vegetation, grassland, wetland vegetation, and cultivated lands resulting  
26 from the construction of project facilities would reduce the amount of available nesting and foraging  
27 habitat for special-status and non-special-status birds (Table 13-83 through Table 13-88). The loss  
28 of nesting and foraging habitat for yellow-breasted chat, Modesto song sparrow, and least bittern,  
29 and nesting habitat for yellow-headed blackbird would primarily occur as a result of levee  
30 improvements, new roads, and road improvements (Appendix 13C). Yellow-breasted chat and  
31 Modesto song sparrow nesting habitat, and yellow warbler potential recolonization habitat  
32 (Appendix 13B) would also be lost from the construction of the intakes. The central alignment  
33 alternatives (Alternatives 1, 2a, 2b, and 2c) would result in greater impacts on modeled nesting and  
34 foraging habitat for these species compared to the eastern alternatives (Alternatives 3, 4a, 4b, and  
35 4c) and Bethany Reservoir alignment (Alternative 5) largely because of the levee improvements on  
36 Bouldin Island and road improvements throughout the central alignment (Appendix 13C). The loss  
37 of nesting and foraging habitat for loggerhead shrike and yellow-headed blackbird foraging habitat  
38 would primarily occur as a result of the construction of the Southern Forebay (Alternatives 1, 2a, 2b,  
39 2c, 3, 4a, 4b, and 4c) and the placement of RTM and associated conveyor features at the Twin Cities  
40 Complex (all alternatives), on Bouldin Island (Alternatives 1, 2a, 2b, 2c), and on Lower Roberts  
41 Island (Alternatives 3, 4a, 4b, 4c, and 5) and the construction of the Bethany Complex and associated  
42 access roads (Alternative 5; Appendix 13C).



1 **Table 13-83. Impacts on Modeled Nesting and Foraging Habitat for Least Bittern by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres) <sup>a</sup>	Total (acres)
1	5.30	5.37	10.67
2a, 2c	3.68	6.75	10.43
2b	3.46	6.45	9.91
3, 4a, 4c	0.27	0.97	1.24
4b	0.05	0.67	0.72
5	0.48	0.83	1.31

2 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
3 discussion in Section 13.3.1.2.  
4

5 **Table 13-84. Impacts on Modeled Nesting and Foraging Habitat for Loggerhead Shrike by**  
6 **Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	2,353.27	270.30	2,623.57
2a	2,544.42	299.87	2,844.29
2b	2,114.15	291.26	2,405.41
2c	2,237.70	298.30	2,536.00
3	2,118.96	243.54	2,362.50
4a	2,379.38	246.54	2,625.92
4b	1,842.89	237.86	2,080.75
4c	2,004.87	244.89	2,249.76
5	1,389.31	121.39	1,510.70

7 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
8 discussion in Section 13.3.1.2.  
9

10 **Table 13-85. Impacts on Modeled Nesting and Foraging Habitat for Modesto Song Sparrow by**  
11 **Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	59.83	22.87	82.70
2a	58.68	26.77	85.45
2b	52.55	25.51	78.06
2c	55.27	26.29	81.56
3	16.98	11.55	28.53
4a	19.68	12.17	31.85
4b	13.54	10.92	24.46
4c	16.27	11.70	27.97
5	19.95	10.70	30.65

12 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
13 discussion in Section 13.3.1.2.  
14

1 **Table 13-86. Impacts on Modeled Nesting and Foraging Habitat for Yellow-Breasted Chat by**  
 2 **Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	52.87	16.91	69.78
2a	52.37	19.34	71.71
2b	47.87	18.38	66.25
2c	50.03	18.85	68.88
3	11.71	9.83	21.54
4a	13.33	10.46	23.79
4b	8.84	9.50	18.34
4c	11.00	9.97	20.97
5	12.92	9.00	21.92

3 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 4 discussion in Section 13.3.1.2.  
 5

6 **Table 13-87. Impacts on Modeled Nesting and Foraging Habitat for Yellow-Headed Blackbird by**  
 7 **Alternative**

Alternative	Permanent Impacts— Nesting (acres) <sup>a</sup>	Permanent Impacts— Foraging (acres) <sup>a</sup>	Temporary Impacts— Nesting (acres)	Temporary Impacts— Foraging (acres)	Total (acres)
1	5.30	2,311.30	5.37	258.57	2,580.54
2a	3.68	2,503.07	6.75	286.79	2,800.29
2b	3.46	2,074.76	6.45	278.45	2,363.12
2c	3.68	2,196.98	6.75	285.27	2,492.68
3	0.27	2,116.37	0.97	239.17	2,356.78
4a	0.27	2,376.03	0.97	242.11	2,619.38
4b	0.05	1,841.50	0.67	233.70	2,075.92
4c	0.27	2,002.15	0.97	240.52	2,243.91
5	0.48	1,383.86	0.83	117.56	1,502.73

8 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 9 discussion in Section 13.3.1.2.  
 10

11 **Table 13-88. Impacts on Modeled Nesting and Foraging Habitat for Yellow Warbler by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	48.92	12.77	61.69
2a	48.44	14.84	63.28
2b	44.75	13.96	58.71
2c	46.57	14.40	60.97
3	9.34	7.62	16.96
4a	10.46	8.22	18.68
4b	6.77	7.34	14.11
4c	8.59	7.77	16.36
5	9.69	6.80	16.49

1       <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
2 discussion in Section 13.3.1.2.  
3

4       Birds that nest in bridges and culverts (e.g., black phoebe, cliff swallow) may be affected by the  
5 widening of the Hood-Franklin bridge at Snodgrass Slough (all alternatives), the resurfacing of a  
6 bridge on Byron Highway, the resurfacing of an overpass on Lambert Road (all alternatives), in  
7 addition to the widening of a bridge and overpass on SR 12 over Little Potato Slough (Alternatives 1,  
8 2a, 2b, and 2c), and at the replacement of a bridge connecting Mandeville and Bacon Islands over  
9 Connection Slough (Alternatives 1, 2a, 2b, and 2c).

10       Environmental Commitment EC-14: *Construction Best Management Practices for Special-Status*  
11 *Species* would ensure that temporarily disturbed areas are restored (Appendix 3B).

12       Vegetation removal and other construction activities during the breeding season (February 1  
13 through August 31) could result in the mortality or disturbance of nesting birds in and adjacent to  
14 the construction work areas. Removal of nests or suitable nesting habitat and construction-related  
15 noise and visual disturbances during the breeding season could mask calls, disrupt foraging and  
16 nesting behaviors, reduce the functions of nesting habitat, result in the incidental loss of fertile eggs  
17 or nestlings, or otherwise lead to nest abandonment. Construction activities are not expected to  
18 injure or kill foraging or nonbreeding adults or fledged juveniles who are no longer dependent on  
19 adults because individuals are highly mobile and would avoid direct injury or mortality from slow-  
20 moving or stationary construction equipment. Night lighting may have the potential to affect the  
21 behavior of nesting special-status and non-special-status birds; studies show that birds are  
22 attracted to artificial lights, which may disrupt their behavioral patterns or cause collision-related  
23 fatalities (Gauthreaux and Belser 2006:67–86). All lights used during nighttime construction would  
24 be downcast, cut-off type fixtures with non-glare finishes, natural light qualities, and minimum  
25 intensity. Construction-related lighting would be shielded and oriented in such a manner so as not to  
26 subject the immediate surroundings to extremes in the levels of light, however, these types of light  
27 generate an ambient nighttime luminescence that is visible from a distance. Effects of construction-  
28 related light would be greater at the intakes where existing conditions are dark and rural in  
29 comparison with the Twin Cities Complex, Southern Complex, and Bethany Complex where there are  
30 existing sources of light that may illuminate suitable habitat. Construction activities could result in  
31 dust and the discharge of construction-related fluids, which could also affect individuals and their  
32 habitat if present in or adjacent to work areas. Environmental Commitments EC-1: *Conduct Worker*  
33 *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
34 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive*  
35 *Dust Control*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix  
36 3B) would reduce these potential impacts by (1) training construction staff on protecting nesting  
37 special-status and non-special-status birds, reporting requirements, and the ramifications for not  
38 following these measures; (2) implementing spill prevention and containment plans that would  
39 avoid material spills that could affect suitable habitat; and (3) having a biological monitor present  
40 that would ensure that non-disturbance buffers are intact and all protective measures are being  
41 implemented, where applicable.

42       There are no occurrences of least bittern or yellow warbler in the vicinity of the project footprints  
43 under any alternative. There is one occurrence of yellow-breasted chat (California Department of  
44 Water Resources 2011) along the proposed intake haul road footprint, north of Lambert Road and  
45 one occurrence of yellow-headed blackbird (occurrence #9, California Department of Fish and  
46 Wildlife 2020a) that overlaps with the footprint of a new access road along the Sacramento River

1 west of Beach Lake. The nearest bank swallow occurrence is in the Brannan Island State Recreation  
2 Area approximately 6 miles west of the central alignment alternatives (Alternatives 1, 2a, 2b, and  
3 2c). Modesto song sparrow is ubiquitous throughout the study area and is expected to nest and  
4 forage in the majority of modeled habitat. One occurrence for loggerhead shrike is within the  
5 footprint of a road right-of-way west of the Southern Forebay (California Department of Water  
6 Resources 2011), but there are many other loggerhead shrike occurrences (California Department of  
7 Water Resources 2011) in the vicinity of Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and  
8 4c) and the Bethany Complex and associated access roads (Alternative 5).

9 Field investigations would be conducted prior to and during construction under all alternatives to  
10 more specifically identify appropriate construction methods and design criteria addressed in the  
11 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
12 and address the establishment of geological and groundwater monitoring programs (Delta  
13 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
14 variety of ground-disturbing activities that would vary in duration from several hours to  
15 approximately 6 weeks (Section 3.15; Delta Conveyance Design and Construction Authority 2022a,  
16 2022b) and could result in impacts on habitat and the potential for injury, mortality, and the  
17 disruption of normal behaviors of special-status and non-special-status birds. Geotechnical  
18 investigations that would occur in the West Tracy Fault Study area, and over the tunnel alignment  
19 footprints which include test trenches, CPTs, soil borings, and geophysical arrays, would result in  
20 impacts on modeled habitat for least bittern, loggerhead shrike, Modesto song sparrow, yellow-  
21 breasted chat, yellow warbler (Appendix 13C) with the greatest impacts on grassland and cultivated  
22 lands. The Bethany Fault Study geotechnical investigations (Alternative 5) would be completed in a  
23 single day and would involve placing approximately 20 ERT probes 0.5 inch in diameter. The study  
24 would be conducted entirely on foot, perpendicular to the tunneled portion of the Bethany Reservoir  
25 Aqueduct (Delta Conveyance Design and Construction Authority 2022a, 2022b). The Bethany Fault  
26 Study could result in minor disruption of normal behaviors, but because of its small footprint and  
27 the short (1-day) duration of the disturbance, impacts on modeled habitat are not quantified and are  
28 considered negligible. The following field investigations would be conducted within proposed  
29 surface construction footprints of project facilities (including portions of tunnel alignments) and  
30 would temporarily affect habitat: test trenches, CPTs, soil borings, ERT, groundwater testing and  
31 monitoring, monument installation, pile installation test methods at the north Delta intakes, pilot  
32 studies for settlement, agronomic testing, and utility potholing. These temporary impacts are not  
33 characterized as an additional loss of habitat because impacts for these locations have already been  
34 quantified within the construction-related footprints but could still result in the potential for injury,  
35 mortality, and disruption of normal behaviors of special-status and non-special-status birds if  
36 present in the vicinity, as discussed above for conveyance facility construction. Environmental  
37 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
38 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
39 *Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
40 (Appendix 3B) would reduce these potential impacts by (1) training construction staff on protecting  
41 nesting special-status and non-special-status birds, reporting requirements, and the ramifications  
42 for not following these measures; (2) implementing spill prevention and containment plans that  
43 would avoid material spills that could affect suitable habitat; and (3) having a biological monitor  
44 present that would ensure that non-disturbance buffers are intact and all protective measures are  
45 being implemented, where applicable. Noise and visual disturbances from helicopter surveys to  
46 identify buried groundwater and natural gas wells throughout the project area and pile installation

1 test methods at the north Delta intakes may also cause disturbance to individuals, as described  
2 above under construction-related effects.

### 3 Operations

4 The operation of project facilities would not require ground disturbance or result in additional  
5 habitat loss, but project operations would generate small levels of noise, have permanent light  
6 sources, and require the periodic presence of staff and vehicle traffic. Noise from the operation of  
7 the water conveyance facilities would not be discernably higher than existing conditions (Chapter  
8 24, Section 24.4.3.2). Permanent facility lighting associated with project facilities under all  
9 alternatives could extend into suitable habitat for special-status and non-special-status birds, which  
10 could affect the behavior of individuals, as described above under construction-related effects;  
11 however, as stated in Chapter 3, Section 3.4.12, permanent lighting at project facilities would be  
12 motion activated, downcast, cut-off type fixtures with non-glare finishes, and therefore permanent  
13 facilities would remain dark the majority of the time at night, which would minimize the potential  
14 for this impact.

15 Power for construction and operation of the conveyance facilities has been designed to use existing  
16 power lines and underground conduit to the extent feasible under all project alternatives. Most new  
17 project lines would be placed on existing poles and towers and therefore would not substantially  
18 alter the existing landscape. However, new aboveground high-voltage transmission and SCADA lines  
19 would be constructed to power the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c)  
20 and the Bethany Complex under Alternative 5 (Chapter 3, Figure 3-13 and Figure 3-14). The  
21 potential for collisions with new project lines varies by species and depends primarily on its level of  
22 exposure (or proximity of the bird's habitat and resources to the transmission line) and its  
23 sensitivity (morphological and behavioral characteristics that influence the bird's propensity to  
24 collide with a line). Loggerhead shrike, Modesto song sparrow, yellow-breasted chat, and yellow  
25 warbler are relatively maneuverable. Least bittern is less maneuverable because of its body shape,  
26 but there is minimal suitable habitat in the vicinity of proposed lines. Flocking species such as  
27 yellow-headed blackbird are more vulnerable than solitary species such as loggerhead shrike or  
28 yellow-breasted chat. Modeled habitat for special-status birds and natural communities that are  
29 suitable for nesting are present in the vicinity of proposed lines and therefore some potential for  
30 collision risk exists. Transmission line towers also provide perching substrate for raptors, which are  
31 predators to many special-status and non-special-status bird species. The existing network of  
32 transmission lines in the study area currently poses these risks and any incremental risk associated  
33 with the new power line corridors would be expected to be low.

34 Bank swallows are a riparian species that have evolved to deal with a dynamic system that changes  
35 with annual variation in variables such as rainfall, or late snowpack runoff. The primary threat to the  
36 species is loss of nesting habitat from the placement of rock revetment for levee stabilization.  
37 Because of this limited available habitat, and the reduction of natural river process, the species is  
38 highly sensitive to (1) reductions in winter flows that are necessary to erode banks for habitat  
39 creation, and (2) high flows during the breeding season. The potential impacts of changes in  
40 upstream flows during the breeding season on bank swallows are the flooding of active burrows and  
41 destruction of burrows from increased bank sloughing. Chapter 5, *Surface Water*, details the  
42 hydrologic modeling methods (Appendix 5A, *Modeling Technical Appendix*, Section B, *Hydrology and*  
43 *Systems Operations Modeling*) and results (Appendix 5A, Section B, Attachment 3, *CalSim 3 Modeling*  
44 *Results*) with respect to flows within and upstream of the Delta. Based on hydrologic modeling  
45 results, modeled flows under all project alternatives are not expected to change substantially

1 beyond the existing variation in flows. For many months, there would be little to no change in flow  
2 under the project alternatives, relative to existing conditions, and for those months where there are  
3 changes in flow rates, flows would remain within the range occurring under existing conditions.  
4 Thus, the project is not anticipated to result in any flow-related changes in rivers upstream of the  
5 Delta that would affect bank swallow breeding success, relative to existing conditions.

6 Similarly, project operations were analyzed for potentially altered river flows within and upstream  
7 of the Delta that may affect habitat of other nesting birds, particularly those that use riparian or tidal  
8 wetlands. Modeled flows under all project alternatives are not expected to change substantially  
9 beyond the existing variation in flows (Chapter 9). Thus, the project is not anticipated to alter  
10 nesting bird habitats within or upstream of the Delta, relative to existing conditions.

11 Changes in water operations under all project alternatives have the potential to exacerbate  
12 bioaccumulation of mercury in nesting birds using tidal wetlands and adjacent terrestrial habitats.  
13 Largemouth bass was used as an indicator species for analysis of impacts from changes in  
14 operations from the construction of the water conveyance facilities because they are good indicators  
15 of mercury contamination throughout the aquatic foodweb (Wood et al. 2010:67). Although the  
16 magnitude of methylmercury bioaccumulation differs among species and foodwebs, methylmercury  
17 can be transported to terrestrial foodwebs through consumption of aquatic prey (Cristol et al.  
18 2008:335), therefore changes in aquatic foodweb methylmercury concentrations are assumed to  
19 result in changes in adjacent terrestrial foodwebs. The modeled effects of mercury concentrations  
20 from changes in water operations on largemouth bass did not differ substantially from existing  
21 conditions (Appendix 9H); therefore, results also indicate nesting bird mercury exposure would not  
22 measurably increase as a result of project operations.

23 Microcystin toxins originate in aquatic systems and can be transported through foodwebs through  
24 consumption (Moy et al. 2016:A). Microcystins have also been found in terrestrial foodwebs, such as  
25 spiders and songbirds in riparian habitats, likely through consumption of emergent aquatic insects  
26 (Moy et al. 2016:A, E), and could affect nesting bird populations if project operations result in  
27 conditions that promote *Microcystis* blooms. Operation of all project alternatives is not expected to  
28 substantially change the five factors that could create conditions more conducive to CHAB formation  
29 (i.e., temperature, residence time, nutrients, water velocities and associated turbulence and mixing,  
30 and water clarity and associated irradiance) relative to existing conditions upstream of the Delta or  
31 within the Delta (Chapter 9). The water quality modeling results show a potential for increased  
32 residence time in some locations and months within the central Delta, namely Discovery Bay where  
33 residence times are already very long, which could contribute to increased *Microcystis* bloom size in  
34 some years at these locations if the remaining four environmental factors were also at levels  
35 conducive to forming CHABs. Nevertheless, based on known *Microcystis* dynamics in the Delta a  
36 small increase of residence time at Discovery Bay would not cause *Microcystis* blooms to  
37 substantially increase in size or last substantially longer, relative to existing conditions. Because the  
38 project alternatives, through their effects on the five factors potentially associated with CHABs in the  
39 Delta, are not expected to cause Delta CHABs to be substantially larger in size, and because bloom  
40 size does not necessarily dictate toxin concentration in the water, the project alternatives are not  
41 expected to substantially increase microcystin or any other cyanotoxins in the Delta that could cause  
42 a substantial adverse impact on other nesting special-status and non-special-status birds, relative to  
43 existing conditions.

44 Current use and legacy pesticides have the potential to bioaccumulate in the food items of nesting  
45 bird species. Operation of all project alternatives and potential runoff from project facilities would

1 not result in substantial increases in pesticide concentrations in Delta waters or in Delta outflows  
2 and would not result in land-use changes that would increase use of pesticides, relative to existing  
3 conditions (Chapter 9). Therefore, the project alternatives would not substantially increase pesticide  
4 exposure to other nesting special-status and non-special-status birds.

5 Changes in water operations under all project alternatives have the potential to exacerbate  
6 bioaccumulation of selenium in nesting birds using tidal wetlands and adjacent terrestrial habitats.  
7 Modeled selenium concentrations in the eggs of insect-eating and fish-eating birds were below the  
8 level of concern and did not differ substantially from existing conditions under all alternatives  
9 (Appendix 9J). Therefore, the project alternatives are not anticipated to substantially increase the  
10 risk of selenium contamination in nesting special-status and non-special-status birds.

### 11 Maintenance

12 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
13 in periodic disturbances that could affect special-status and non-special-status birds.

14 The maintenance of aboveground water conveyance facilities for all project alternatives would  
15 result in periodic disturbances within and adjacent to nesting and foraging habitat for raptors.  
16 Maintenance activities at the north Delta intakes (all project alternatives) would include semiannual  
17 general and ground maintenance (e.g., mowing, vegetation trimming, herbicide application), annual  
18 sediment and debris removal at intakes, and periodic maintenance of the intake gates and  
19 associated structures approximately every 1 to 5 years. Maintenance activities at launch, reception,  
20 and maintenance shafts along the central alignment (Alternatives 1, 2a, 2b, and 2c), eastern  
21 alignment (Alternatives 3, 4a, 4b, and 4c), and Bethany Reservoir alignment (Alternative 5) would  
22 include similar semiannual general and ground maintenance in addition to daily inspections by  
23 vehicle. Existing access roads in the vicinity of the intakes and shafts would be repaved every 15  
24 years.

25 Large equipment or cranes required for maintenance of the intakes (all alternatives), the Southern  
26 Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) or Bethany Complex (Alternative 5), and for  
27 vegetation removal activities that take place during the breeding season (February 1 through August  
28 31) could disrupt foraging and nesting behaviors and result in potential injury and mortality of  
29 individuals. Herbicide application could reduce the functions of foraging habitat and result in direct  
30 mortality of individuals if present. Adults and fledged young would be expected to avoid slow-  
31 moving maintenance equipment and therefore there would be a low probability of vehicle strikes of  
32 nonbreeding birds. Maintenance activities would generally be conducted during the day, except for  
33 emergency maintenance, and would therefore not require additional lighting. Noise effects from  
34 maintenance activities could negatively affect breeding birds, as described above under  
35 construction-related effects.

### 36 ***CEQA Conclusion—All Project Alternatives***

37 Construction, operations, and maintenance of the water conveyance facilities under all project  
38 alternatives would result in impacts on special-status and non-special-status bird species through  
39 the permanent and temporary loss of modeled habitat and the potential for injury, mortality, and the  
40 disruption of normal behaviors. For all project alternatives, changes in water operations would not  
41 be expected to result in a measurable increase in mercury or selenium bioavailability or pesticide or  
42 microcystin exposure to nesting special-status and non-special-status birds and would not result in  
43 changes in upstream flows that would interfere with nesting habitat for bank swallow. The

1 temporary impacts on habitat and potential impacts of project construction, operations, and  
2 maintenance activities would be reduced by Environmental Commitments EC-1: *Conduct Worker*  
3 *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
4 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive*  
5 *Dust Control*; and EC-14: *Construction Best Management Practices for Special-Status Species*  
6 (Appendix 3B); however, even with these commitments, the impacts of the project alternatives on  
7 special-status and non-special-status birds would be significant. The CMP would be required to  
8 offset the loss of habitat for special-status and non-special-status nesting birds by creating and  
9 protecting riparian, tidal emergent wetland, and grassland habitat for least Bell's vireo, western  
10 yellow-billed cuckoo, California black rail, Swainson's hawk, and burrowing owl (Appendix 3F,  
11 Sections 3F.3.2.3, 3F.3.2.5, and 3F.3.3.2, and Attachment 3F.1, Table 3F.1-3) on Bouldin Island and  
12 the I-5 ponds and the protection of agricultural foraging habitat for sandhill cranes, Swainson's  
13 hawk, and tricolored blackbird (Appendix 3F, Attachment 3F.1, Table 3F.1-3), which would mitigate  
14 the loss of nesting and foraging habitat of special-status and non-special-status birds to a less-than-  
15 significant level. Mitigation Measures AES-4b: *Minimize Fugitive Light from Portable Sources Used for*  
16 *Construction*; AES-4c: *Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light*  
17 *Spill from Truck Headlights toward Residences* (Chapter 18); NOI-1: *Develop and Implement a Noise*  
18 *Control Plan* (Chapter 24); BIO-2b: *Avoid and Minimize Impacts on Biological Resources from*  
19 *Maintenance Activities*; BIO-2c: *Electrical Power Line Support Placement*; and BIO-36a: *Conduct*  
20 *Nesting Surveys for Special-Status and Non-Special-Status Birds and Raptors and Implement*  
21 *Protective Measures to Avoid Disturbance of Nesting Birds and Raptors*, would be required to avoid  
22 and minimize the potential for injury, mortality, or the disruption of normal behaviors and  
23 disturbances to habitat. The impacts on special-status and non-special-status bird species from the  
24 project alternatives would be less than significant with mitigation because the aforementioned  
25 measures would replace lost habitat, reduce direct effects on these species, including habitat, noise,  
26 and visual disturbances, by providing environmental awareness training to construction personnel,  
27 by implementing protective measures during maintenance activities, and avoidance measures for  
28 nesting birds during construction.

### 29 **Mitigation Measure CMP: Compensatory Mitigation Plan**

30 The CMP (see Impact BIO-1 for a summary discussion of the CMP) would offset the loss of  
31 nesting and foraging habitat for special-status and non-special-status birds by creating and  
32 protecting riparian, tidal emergent wetland, and grassland natural communities on Bouldin  
33 Island and the I-5 ponds (Appendix 3F, Sections 3F.3.2.3, 3F.3.2.5, and 3F.3.3.2,) and by  
34 restoring or protecting nesting and foraging habitat for western yellow-billed cuckoo, California  
35 black rail, sandhill crane, Swainson's hawk, least Bell's vireo, and tricolored blackbird (Appendix  
36 3F, Attachment 3F.1, Table 3F.1-3, CMP-16: *Western Yellow-Billed Cuckoo Habitat*, CMP-17:  
37 *California Black Rail Habitat*, CMP-18a: *Sandhill Crane Roosting Habitat*, CMP-18b: *Sandhill Crane*  
38 *Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*, CMP-19b: *Swainson's Hawk*  
39 *Foraging Habitat*, CMP-21: *Least Bell's Vireo*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
40 CMP-22b: *Tricolored Blackbird Foraging Habitat*).

### 41 **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for** 42 **Construction**

43 See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.



1           **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary,**  
2           **to Prevent Light Spill from Truck Headlights toward Residences**

3           See description of Mitigation Measure AES-4c under Impact AES-4 in Chapter 18.

4           **Mitigation Measure NOI-1: Develop and Implement a Noise Control Plan**

5           See description of Mitigation Measure NOI-1 under Impact NOI-1 in Chapter 24.

6           **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
7           **Resources from Maintenance Activities**

8           See description of Mitigation Measure BIO-2b under Impact BIO-2.

9           **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

10          See description of Mitigation Measure BIO-2c under Impact BIO-2.

11          **Mitigation Measure BIO-36a: Conduct Nesting Surveys for Special-Status and Non-Special-**  
12          **Status Birds and Raptors and Implement Protective Measures to Avoid Disturbance of**  
13          **Nesting Birds and Raptors**

14          See description of Mitigation Measure BIO-36a under Impact BIO-36.

15          ***Mitigation Impacts***

16          As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
17          mitigation measure impacts. The analyses below consider the potential impacts associated with  
18          implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
19          Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
20          *Measures*.

21          *Compensatory Mitigation*

22          The creation and enhancement of wetlands as well as habitat for special-status species under the  
23          project's CMP would affect special-status and non-special-status birds through the permanent and  
24          temporary loss of habitat (Appendix 13C) from vegetation removal and grading to create the  
25          appropriate topography and soil conditions to establish or restore habitats.

26          In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
27          enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
28          vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located, which could  
29          support suitable nesting habitat for special-status and non-special-status birds and could result in  
30          the disruption of normal behaviors, injury, or mortality of individuals. Site-specific analyses are not  
31          provided because locations of potential non-bank sites are not currently known.

32          Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
33          crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
34          management of agricultural areas but may also include natural communities in the study area  
35          (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
36          *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
37          CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and

1 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could potentially contain suitable  
2 nesting habitat for special-status and non-special-status birds and management activities could  
3 affect this habitat and result in the disruption of normal behaviors, injury, or mortality. Site-specific  
4 analyses are not provided because locations of potential protection instruments are not currently  
5 known.

6 The CMP and site-specific permitting approvals would account for any losses of nesting habitat from  
7 habitat creation by adjusting the overall commitment of riparian and wetland creation and  
8 grassland and cultivated lands protection (Appendix 3F, Section 3F.1, Section 3F.2.4, and  
9 Attachment 3F.1, Table 3F.1-3, CMP-0: *General Design Guidelines*) and therefore reduce any habitat  
10 losses associated with the CMP to less than significant. The creation and enhancement activities  
11 would also have the potential for injury, mortality, and the disruption of normal behaviors of  
12 individuals if restoration activities occur during the breeding season (February 1 through August  
13 31), as described above under construction-related effects. Environmental Commitments EC-1:  
14 *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management*  
15 *Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11:  
16 *Fugitive Dust Control*; and EC-14: *Construction Best Management Practices for Biological Resources*  
17 (Appendix 3B); and Mitigation Measure BIO-36a: *Conduct Nesting Surveys for Special-Status and*  
18 *Non-Special-Status Birds and Raptors and Implement Protective Measures to Avoid Disturbance of*  
19 *Nesting Birds and Raptors* would reduce the potential for injury, mortality, and the disruption of  
20 normal behaviors of individuals to less than significant. These impacts would be less than significant  
21 with mitigation because the aforementioned measures would (1) train construction staff on  
22 protecting nesting birds, the requirements for avoiding impacts, and the ramifications for not  
23 following these measures; (2) minimize dust; (3) implement spill prevention and containment plans  
24 that would avoid material spills that could affect habitat; (4) prior to and during restoration and  
25 enhancement ground disturbance, establish protective buffers around active nest sites; and (5) have  
26 a biological monitor present that would ensure that non-disturbance buffers are intact and all  
27 protective measures are being implemented where applicable.

28 Tidal restoration and wetland creation and enhancement at Bouldin Island and the I-5 ponds under  
29 the CMP have the potential to exacerbate bioaccumulation of mercury in nesting special-status and  
30 non-special-status birds by creating newly inundated wetlands. Methylmercury can be transported  
31 from aquatic to adjacent terrestrial foodwebs through ingestion of aquatic prey items, where it can  
32 biomagnify and expose songbirds to high concentrations in large insect prey (Cristol et al.  
33 2008:335). Potential effects of increased mercury exposure are likely low for many of these species  
34 because they primarily forage on lower-trophic items with less potential to biomagnify mercury  
35 such as seeds, although some riparian songbirds have been found to have high mercury  
36 concentrations. Because Bouldin Island and the I-5 ponds sites consist of existing managed and  
37 agricultural wetlands and ponds, wetland creation and enhancement are not expected to increase  
38 mercury methylation, relative to existing conditions. Monitoring and adaptive management plans as  
39 described in the CMP (Appendix 3F, Section 3F.7.2) would include mercury monitoring and adaptive  
40 management at Bouldin Island and the I-5 ponds to prevent increased mercury methylation, relative  
41 to existing conditions. Mitigation Measure WQ-6: *Develop and Implement a Mercury Management*  
42 *and Monitoring Plan*, which contains measures to assess the amount of mercury at tidal restoration  
43 sites before project development, followed by appropriate design, monitoring, and adaptive  
44 management, would minimize the potential for any effects of increased methylmercury exposure  
45 due to tidal restoration. Therefore, implementation of the CMP would not be expected to have a  
46 significant adverse impact on nesting special-status and non-special-status birds.

1 Herbicides would be applied at CMP restoration sites to remove nonnative vegetation for site  
2 preparation and to support establishment of new plantings. Natural habitats contribute fewer  
3 pesticides to receiving waters than agricultural areas where pesticides are applied. Any newly  
4 created wetlands or enhanced natural habitat could also filter stormwater to remove solids and  
5 either improve or have no effect on pesticide concentrations in discharges to receiving waters,  
6 relative to existing conditions. As such, restoration areas are expected to somewhat reduce, rather  
7 than increase, runoff of pesticides into adjacent waterbodies. Environmental Commitment EC-14:  
8 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would ensure that  
9 herbicides would be applied in such a manner as to prevent primary or secondary poisoning of  
10 nesting special-status and non-special-status birds.

11 Habitat creation and enhancement under the CMP has the potential to result in conditions that  
12 promote CHABs, which could result in impacts on nesting special-status and non-special-status birds  
13 using created and/or enhanced wetland and aquatic habitats. High levels of microcystins have also  
14 been found in terrestrial foodwebs, such as spiders and songbirds in riparian habitats, likely through  
15 consumption of emergent aquatic insects (Moy et al. 2016:A, E), and could affect nesting special-  
16 status and non-special-status birds if they forage in or near habitats with conditions that promote  
17 CHABs. Monitoring and adaptive management plans as described in the CMP (Appendix 3F, Section  
18 3F.7.2) would include CHAB monitoring and adaptive management at Bouldin Island and the I-5  
19 ponds to prevent increased CHAB formation, relative to existing conditions. As discussed in Chapter  
20 9, tidal habitat creation is not expected to cause substantial additional *Microcystis* production.  
21 Therefore, implementation of the CMP would not result in increased CHAB formation that could  
22 cause substantial adverse impacts on nesting special-status and non-special-status birds, relative to  
23 existing conditions.

24 Wetland restoration actions may provide habitat for nesting special-status and non-special-status  
25 birds, which could increase the risk of selenium toxicity to these species. It is difficult to determine  
26 whether the effects of potential increases in selenium bioavailability associated with restoration  
27 activities under the CMP would lead to adverse effects. Potential effects of increased selenium  
28 exposure are likely low for these species because they primarily forage on lower-trophic items with  
29 less potential to biomagnify selenium such as seeds and insects, and existing selenium  
30 concentrations in the Sacramento River watershed are low (Central Valley Regional Water Quality  
31 Control Board 1988:14). Modeled concentrations in insect-eating bird eggs under existing  
32 conditions in the Delta were below levels of concern for other bird species (Appendix 9J). Analysis  
33 included in Chapter 9 for Impact WQ-10: *Effects on Selenium Resulting from Facility Operations* found  
34 that compensatory mitigation would not result in a measurable increase in selenium concentrations  
35 or selenium bioavailability. Should increases in selenium occur as a result of compensatory  
36 mitigation, such increases are not expected to negatively affect nesting special-status and non-  
37 special-status birds due to their low trophic position. Therefore, potential increased exposure to  
38 selenium resulting from restoration would not be expected to adversely affect nesting special-status  
39 and non-special-status bird populations. The impact on nesting special-status and non-special-  
40 status birds from the project with the CMP would be less than significant with mitigation.

#### 41 *Other Mitigation Measures*

42 Some mitigation measures would involve ground disturbance, the use of heavy equipment, pile  
43 driving, or pesticides that would have the potential to expose special-status and non-special-status  
44 bird species to excessive noise, visual disturbance, dust, and hazardous materials that could cause  
45 loss of modeled habitat, disruption of normal behaviors, and injury or mortality. The mitigation

1 measures with potential to result in impacts on special-status and non-special-status bird species  
2 are similar to those discussed under Impact BIO-31: *Impacts of the Project on Western Yellow-Billed*  
3 *Cuckoo*. Impacts on special-status and non-special-status bird species resulting from mitigation  
4 measures would be similar to construction effects of the project alternatives in certain construction  
5 areas and would contribute to special-status and non-special-status bird species impacts of the  
6 project alternatives.

7 The impacts of habitat loss, noise, visual disturbance, and exposure to dust or hazardous materials  
8 on special-status and non-special-status bird species would be reduced through the CMP,  
9 environmental commitments, and Mitigation Measure NOI-1: *Develop and Implement a Noise Control*  
10 *Plan* as detailed under Impact BIO-31: *Impacts of the Project on Western Yellow-Billed Cuckoo*. In  
11 addition, Mitigation Measure BIO-36a: *Conduct Nesting Surveys for Special-Status and Non-Special-*  
12 *Status Birds and Raptors and Implement Protective Measures to Avoid Disturbance of Nesting Birds*  
13 *and Raptors* would require species-specific measures to reduce these impacts. Therefore, impacts on  
14 special-status and non-special-status bird species from other mitigation measures would be  
15 reduced to less than significant.

16 Overall, the impacts on special-status and non-special-status bird species from construction of  
17 compensatory mitigation and implementation of other mitigation measures, combined with project  
18 alternatives, would not change the impact conclusion of less than significant with mitigation.

#### 19 **Impact BIO-42: Impacts of the Project on Least Bell's Vireo**

20 The methods for the analysis of effects on least Bell's vireo appear in Section 13.3.1.1, and  
21 information on the species life history and recolonization habitat suitability model are presented in  
22 the species account in Appendix 13B, Section 13B.77, *Least Bell's Vireo*. At the time of this writing,  
23 least Bell's vireo is not assumed to be a resident of the Delta; thus, the habitat suitability model  
24 identifies areas of potential recolonization. Because there are so few occurrences in or around the  
25 Delta from which to confidently determine a range within the study area, the entire Delta is assumed  
26 to have potential to provide recolonization habitat.

#### 27 ***All Project Alternatives***

##### 28 **Construction**

29 The construction of all project alternatives would result in the permanent and temporary loss of  
30 modeled recolonization habitat, and the potential for injury, mortality, and the disruption of normal  
31 behaviors. The loss of habitat would primarily occur as a result of levee improvements, new roads  
32 and road improvements, and construction of the intakes (Appendix 13C). The central alignment  
33 alternatives (Alternatives 1, 2a, 2b, and 2c) would result in greater impacts on modeled habitat  
34 compared to the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and the Bethany  
35 Reservoir alignment alternative (Alternative 5) largely because of the levee improvements on  
36 Bouldin Island and road improvements throughout the central alignment. Acres of permanent and  
37 temporary impacts on modeled habitat for least Bell's vireo are shown in Table 13-89. The losses of  
38 habitat and potential for injury and mortality would result from vegetation removal in advance of  
39 grading and excavation for the construction of project infrastructure. Environmental Commitment  
40 EC-14: *Construction Best Management Practices for Special-Status Species* would ensure that  
41 temporarily disturbed areas are restored (Appendix 3B).

1 **Table 13-89. Impacts on Modeled Recolonization Habitat for Least Bell's Vireo by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	48.92	12.77	61.69
2a	48.44	14.84	63.28
2b	44.75	13.96	58.71
2c	46.57	14.40	60.97
3	9.34	7.62	16.96
4a	10.46	8.22	18.68
4b	6.77	7.34	14.11
4c	8.59	7.77	16.36
5	9.69	6.80	16.49

2 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
3 discussion in Section 13.3.1.2.  
4

5 If least Bell's vireo were to nest in or adjacent to work areas, construction-related noise and visual  
6 disturbances during the breeding season could mask calls, disrupt foraging and nesting behaviors,  
7 and reduce the functions of nesting habitat for the species. Intake construction would require the  
8 use of loud, heavy equipment within the construction site and along the access roads to the site. Pile  
9 driving would be required for intake construction, which would create noise and vibration effects in  
10 and adjacent to modeled recolonization habitat. Construction-related night lighting may also have  
11 the potential to affect least Bell's vireo. While there is no data on effects of night lighting on this  
12 species, studies show that birds of other species are attracted to artificial lights and this may disrupt  
13 their behavioral patterns or cause collision-related fatalities (Gauthreaux and Belser 2006:67–86).  
14 All lights used during nighttime construction would be downcast, cut-off type fixtures with non-  
15 glare finishes, natural light qualities, and minimum intensity. Construction-related lighting would be  
16 shielded and oriented in such a manner so as not to subject the immediate surroundings to extremes  
17 in the levels of light, however, these types of light generate an ambient nighttime luminescence that  
18 is visible from a distance (Chapter 18, Impact AES-4: *Create New Sources of Substantial Light or Glare*  
19 *That Would Adversely Affect Daytime or Nighttime Views of the Construction Areas or Permanent*  
20 *Facilities*). Construction activities could expose least Bell's vireo to dust if present in or adjacent to  
21 work areas. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop*  
22 *and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill*  
23 *Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14:  
24 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these  
25 potential impacts by (1) training construction staff on protecting the species, reporting  
26 requirements, and the ramifications for not following these measures; (2) implementing spill  
27 prevention and containment plans that would avoid material spills that could affect suitable habitat;  
28 and (3) having a biological monitor present that would ensure that non-disturbance buffers are  
29 intact and all protective measures are being implemented, where applicable.

30 No known occurrences of least Bell's vireo are located within the construction footprint for any of  
31 the alternatives (California Department of Fish and Wildlife 2020a; eBird 2021). Nesting least Bell's  
32 vireos have not been detected within or around either the central alignment (Alternatives 1, 2a, 2b,  
33 and 2c), the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c), or the Bethany Reservoir  
34 alignment alternative (Alternative 5). The nearest least Bell's vireo occurrence to project impacts  
35 under any alternative is a record of two singing males on Bradford Island in 2018 and 2019 (eBird

2021), which is approximately 5 miles west of the levee improvement work on Bouldin Island (Alternatives 1, 2a, 2b, and 2c), and approximately 15 miles west of a proposed RTM storage area and an associated RTM conveyor on Lower Roberts Island (Alternatives 3, 4a, 4b, 4c, and 5).

Field investigations would be conducted prior to and during construction under all project alternatives to more specifically identify appropriate construction methods and design criteria addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities, and address the establishment of geological and groundwater monitoring programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a variety of ground-disturbing activities that would vary in duration from several hours to approximately 6 weeks (Section 3.15; Delta Conveyance Design and Construction Authority 2022a, 2022b) and could result in impacts on habitat and the potential for injury, mortality, and the disruption of normal behaviors of least Bell's vireo. Geotechnical investigations associated with the tunnels for all project alternatives, which include CPTs and soil borings, would result in impacts on habitat (Appendix 13C). The West Tracy Fault Study and the Bethany Fault Study investigations would not affect modeled habitat for least Bell's vireo. The following field investigations would be conducted within proposed surface construction footprints of project facilities (including portions of tunnel alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT, groundwater testing and monitoring, monument installation, pilot studies for settlement, agronomic testing, and utility potholing. These temporary impacts are not characterized as an additional loss of habitat because impacts for these locations have already been quantified within the construction-related footprints but could still result in the potential for injury, mortality, and the disruption of normal behaviors of least Bell's vireo if present in the work area, as discussed above for conveyance facility construction. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts by (1) training construction staff on protecting the species, reporting requirements, and the ramifications for not following these measures; (2) implementing spill prevention and containment plans that would avoid material spills that could affect suitable habitat; and (3) having a biological monitor present that would ensure that non-disturbance buffers are intact and all protective measures are being implemented, where applicable. Noise and visual disturbances from helicopter surveys to identify buried groundwater and natural gas wells throughout the project area and pile installation test methods at the north Delta intakes may affect least Bell's vireo if present in the vicinity, as described above under construction-related effects.

### Operations

The operation of project facilities would not require ground disturbance or result in additional habitat loss, but project operations would generate small levels of noise, have permanent light sources, and require the periodic presence of staff and vehicle traffic. Noise from the operation of the water conveyance facilities would not be discernably higher than existing conditions (Chapter 24, Section 24.4.3.2) and the periodic presence of staff would not be expected to affect least Bell's vireo if present. Permanent facility lighting could extend into suitable least Bell's vireo habitat and could affect the behavior of individuals if present within the illuminated habitat; however, as stated in Chapter 3, Section 3.4.12, permanent lighting at project facilities would be motion activated, downcast, cut-off type fixtures with non-glare finishes, and therefore permanent facilities would remain dark the majority of the time at night, which would minimize the potential for this impact.

1 Power for construction and operation of the conveyance facilities has been designed to use existing  
2 power lines and underground conduit to the extent feasible. Most new project lines would be placed  
3 on existing poles and towers and therefore would not substantially alter the existing landscape. New  
4 aboveground high-voltage transmission and SCADA lines would be constructed to power the  
5 Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) and the Bethany Complex under  
6 Alternative 5 (Chapter 3, Figure 3-13 and Figure 3-14), where the landcover in that region is  
7 primarily grassland and agriculture with minimal riparian vegetation that would support least Bell's  
8 vireo. Least Bell's vireo does not currently breed in the study area. The species typically occurs in  
9 early to mid-successional riparian habitat, which is very limited in the vicinity of the proposed new  
10 transmission lines in the southwestern portion of the study area. The species does not form flocks  
11 and generally remains at or below the riparian canopy. Therefore, it is highly unlikely that this  
12 species would experience bird strikes at project transmission lines.

13 Changes in water operations under all project alternatives have the potential to exacerbate  
14 bioaccumulation of methylmercury in least Bell's vireo. Methylmercury can be transported from  
15 aquatic to adjacent terrestrial foodwebs through ingestion of aquatic prey items, where it can  
16 biomagnify and expose songbirds to high concentrations in insect prey (Cristol et al. 2008:335).  
17 Largemouth bass was used as an indicator species for analysis of impacts from changes in  
18 operations from the construction of the water conveyance facilities because they are good indicators  
19 of mercury contamination throughout the aquatic foodweb (Wood et al. 2010:67). Modeled effects  
20 of mercury concentrations from changes in operations of water conveyance facilities on largemouth  
21 bass, did not differ substantially from existing conditions (Appendix 9H). Even though least Bell's  
22 vireo do not use aquatic habitats, the lack of substantial change in aquatic foodweb mercury  
23 concentrations indicates that mercury concentrations in adjacent riparian foodwebs would also not  
24 increase appreciably; therefore, these results indicate that bioavailability of methylmercury to least  
25 Bell's vireo would not measurably increase as a result of project operation.

26 Microcystin toxins originate in aquatic systems and can be transported through foodwebs through  
27 consumption (Moy et al. 2016:A). Microcystins have also been found in terrestrial foodwebs, such as  
28 spiders and songbirds in riparian habitats, likely through consumption of emergent aquatic insects  
29 (Moy et al. 2016:A, E), and can affect least Bell's vireo if they forage in or near habitats with  
30 conditions that promote *Microcystis* blooms. Operation of all project alternatives is not expected to  
31 substantially change the five factors that could create conditions more conducive to CHAB formation  
32 (i.e., temperature, residence time, nutrients, water velocities and associated turbulence and mixing,  
33 and water clarity and associated irradiance) relative to existing conditions upstream of the Delta or  
34 within the Delta (Chapter 9). The water quality modeling results show a potential for increased  
35 residence time in some locations and months within the central Delta, namely Discovery Bay where  
36 residence times are already very long, which could contribute to increased *Microcystis* bloom size in  
37 some years at these locations if the remaining four environmental factors were also at levels  
38 conducive to forming CHABs. Nevertheless, based on known *Microcystis* dynamics in the Delta a  
39 small increase of residence time at Discovery Bay would not cause *Microcystis* blooms to  
40 substantially increase in size or last substantially longer, relative to existing conditions. Because the  
41 project alternatives, through their effects on the five factors potentially associated with CHABs in the  
42 Delta, are not expected to cause Delta CHABs to be substantially larger in size, and because bloom  
43 size does not necessarily dictate toxin concentration in the water, the project alternatives are not  
44 expected to substantially increase microcystin or any other cyanotoxins in the Delta that could cause  
45 a substantial adverse impact on least Bell's vireo, relative to existing conditions.

1 Current use and legacy pesticides have the potential to bioaccumulate in the food items of least  
2 Bell's vireo. Impacts of all project alternatives on pesticides in the Delta were analyzed in Chapter 9.  
3 Operation of all project alternatives and potential runoff from project facilities would not result in  
4 substantial increases in pesticide concentrations in Delta waters or in Delta outflows and would not  
5 result in land-use changes that would increase use of pesticides in or adjacent to habitats used by  
6 least Bell's vireo, relative to existing conditions. Therefore, the project alternatives would not  
7 substantially reduce prey availability or increase pesticide exposure to least Bell's vireo.

8 Changes in water operations under all project alternatives is not expected to affect least Bell's vireo  
9 habitat, but there is some potential to exacerbate bioaccumulation of selenium in least Bell's vireo.  
10 Modeled selenium concentrations in the eggs of insect-eating birds, such as least Bell's vireo, were  
11 below the level of concern and did not differ substantially from existing conditions under all  
12 alternatives (Appendix 9J). Therefore, the project alternatives are not anticipated to substantially  
13 increase the risk of selenium contamination in least Bell's vireo.

#### 14 Maintenance

15 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
16 in periodic disturbances that may affect least Bell's vireo. Maintenance activities at the north Delta  
17 intakes (all project alternatives) would include semiannual general and ground maintenance (e.g.,  
18 mowing, vegetation trimming, herbicide application), annual sediment and debris removal at  
19 intakes, and periodic maintenance of the intake gates and associated structures approximately every  
20 1 to 5 years. Maintenance activities at launch, reception, and maintenance shafts along the central  
21 (Alternatives 1, 2a, 2b, and 2c) and eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c)  
22 and the Bethany Reservoir alignment alternative (Alternative 5) would include similar semiannual  
23 general and ground maintenance in addition to daily inspections by vehicle. Existing access roads in  
24 the vicinity of the intakes and shafts would be repaved every 15 years. Maintenance activities could  
25 reduce the functions of least Bell's vireo habitat if these activities take place during the breeding  
26 season (mid-March through September 1). Maintenance activities would generally be conducted  
27 during the day, except for emergency maintenance, and would therefore not require additional  
28 lighting. Noise effects from maintenance could disturb least Bell's vireos if they use habitat in the  
29 vicinity of water conveyance facilities.

#### 30 **CEQA Conclusion—All Project Alternatives**

31 Construction, operations, and maintenance of the water conveyance facilities under all project  
32 alternatives would result in impacts on least Bell's vireo through the permanent and temporary loss  
33 of modeled habitat potential for injury, mortality, and the disruption of normal behaviors if  
34 individuals are present in the study area. For all project alternatives, changes in water operations  
35 would not be expected to result in a measurable increase in mercury or selenium bioavailability or  
36 increased pesticide or microcystin exposure to least Bell's vireo. The temporary impacts on habitat  
37 and the potential impacts of the disruption of normal behavior from project construction,  
38 operations, and maintenance would be reduced by Environmental Commitments EC-1: *Conduct*  
39 *Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*;  
40 *EC-3: Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11:  
41 *Fugitive Dust Control*, and EC-14: *Construction Best Management Practices for Special-Status Species*  
42 (Appendix 3B); however, even with these commitments, the impacts of the project alternatives on  
43 least Bell's vireo would be significant. The CMP would be required to offset the loss of migratory  
44 habitat (Appendix 3F, Section 3F.3.3.1 and Attachment 3F.1, Table 3F.1-3, CMP-21: *Least Bell's*



1 *Vireo*), which would reduce the impact associated with habitat loss to less than significant.  
2 Mitigation Measures AES-4b: *Minimize Fugitive Light from Portable Sources Used for Construction*;  
3 AES-4c: *Install Visual Barriers along Access Routes, Where Necessary, to Prevent Light Spill from Truck*  
4 *Headlights toward Residences* (Chapter 18); NOI-1: *Develop and Implement a Noise Control Plan*  
5 (Chapter 24); BIO-2b: *Avoid and Minimize Impacts on Biological Resources from Maintenance*  
6 *Activities*; BIO-2c: *Electrical Power Line Support Placement*; and BIO-42: *Conduct Surveys and*  
7 *Minimize Impacts on Least Bell's Vireo* would be required to avoid and minimize the potential for  
8 injury, mortality, or the disruption of normal behaviors and disturbances to habitat. The impacts on  
9 least Bell's vireo from the project alternatives would be less than significant with mitigation because  
10 the aforementioned measures would replace lost habitat and reduce direct effects on the species,  
11 including habitat, noise, and visual disturbances, by providing environmental awareness training to  
12 construction personnel, by implementing protective measures during maintenance activities, and  
13 avoidance measures for least Bell's vireo during construction.

#### 14 **Mitigation Measure CMP: Compensatory Mitigation Plan**

15 The CMP (see Impact BIO-1 for a summary discussion of the CMP) would offset the loss of  
16 recolonization habitat (Appendix 3F, Section 3F.3.2.3; Appendix 3F, Section 3F.3.3.1 and  
17 Attachment 3F.1, Table 3F.1-3, CMP-21: *Least Bell's Vireo*) by creating riparian habitat on  
18 Bouldin Island and at the I-5 ponds and managing these areas in perpetuity. Channel margin  
19 restoration would include riparian plantings on rock benches (Appendix 3F, Section 3F.4.3.3.3)  
20 that may provide habitat for least Bell's vireo.

#### 21 **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for** 22 **Construction**

23 See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

#### 24 **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary,** 25 **to Prevent Light Spill from Truck Headlights toward Residences**

26 See description of Mitigation Measure AES-4c under Impact AES-4 in Chapter 18.

#### 27 **Mitigation Measure NOI-1: Develop and Implement a Noise Control Plan**

28 See description of Mitigation Measure NOI-1 under Impact NOI-1 in Chapter 24.

#### 29 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 30 **Resources from Maintenance Activities**

31 See description of Mitigation Measure BIO-2b under Impact BIO-2.

#### 32 **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

33 See description of Mitigation Measure BIO-2c under Impact BIO-2.

#### 34 **Mitigation Measure BIO-42: Conduct Surveys and Minimize Impacts on Least Bell's Vireo**

#### 35 ***All Project Alternatives***

36 The following measures will be required for all construction activities occurring between May  
37 15 through September 1 to avoid and minimize impacts on least Bell's vireo.

- 1 1. Prior to the construction, a noise expert will create a sound level contour map showing the  
2 60 dBA sound level contour specific to the type and location of construction to occur in the  
3 area.
- 4 2. Two weeks prior to construction, a USFWS- and CDFW-approved biologist will conduct daily  
5 surveys, consistent with a USFWS- or CDFW- approved survey protocol, in suitable habitat  
6 where construction-related noise levels could exceed 60 dBA  $L_{eq}$  (1 hour).
- 7 3. If a least Bell's vireo is found, construction activities will be limited such that sound will not  
8 exceed 60 dBA within 500 feet of the habitat being used until the USFWS- and CDFW-  
9 approved biologist has confirmed that the bird has left the area.
- 10 4. If surveys find least Bell's vireos in an area where vegetation will be removed, vegetation  
11 removal will be conducted when the USFWS- and CDFW-approved biologist has confirmed  
12 that least Bell's vireos are not present within 500 feet of vegetation removal activities.
- 13 5. Portable and stationary equipment will be located, stored, and maintained as far as possible,  
14 with a minimum distance of 500 feet, from suitable least Bell's vireo habitat.
- 15 6. All lights will be screened and directed down toward work activities and away from suitable  
16 habitat. A biological construction monitor will ensure that lights are properly directed at all  
17 times during construction.

## 18 ***Mitigation Impacts***

19 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
20 mitigation measure impacts. The analyses below consider the potential impacts associated with  
21 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
22 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
23 *Measures*.

### 24 *Compensatory Mitigation*

25 The creation and enhancement of wetlands as well as habitat for special-status species under the  
26 project's CMP would affect modeled recolonization habitat for least Bell's vireo through the  
27 permanent and temporary loss of habitat (Appendix 13C) from vegetation removal and grading to  
28 create the appropriate topography and soil conditions to establish or restore habitats.

29 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
30 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
31 vernal pool complexes, alkaline seasonal wetlands, or grasslands are located, which do not provide  
32 habitat for least Bell's vireo and therefore there would not likely be any effects on the species. Site-  
33 specific analyses are not provided because locations of potential non-bank sites are not currently  
34 known.

35 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
36 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
37 management of agricultural areas but may also include natural communities in the study area  
38 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
39 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
40 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
41 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could support suitable recolonization

1 habitat for least Bell's vireo and management activities within occupied habitat could result in the  
2 disruption of normal behaviors, injury, or mortality. Site-specific analyses are not provided because  
3 locations of potential protection instruments are not currently known.

4 The CMP and site-specific permitting approvals would account for any losses of least Bell's vireo  
5 recolonization habitat from habitat creation by adjusting the overall commitment of riparian  
6 creation (Appendix 3F, Section 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-3, CMP-0:  
7 *General Design Guidelines*) and therefore reduce any habitat losses associated with the CMP to less  
8 than significant. The creation and enhancement activities would also have the potential for the  
9 disruption of normal behaviors of individuals if restoration activities take place during the breeding  
10 season (March 15 through September 1). Environmental Commitments EC-1: *Conduct Worker*  
11 *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
12 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive*  
13 *Dust Control*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix  
14 3B); and Mitigation Measure BIO-42: *Conduct Surveys and Minimize Impacts on Least Bell's Vireo*  
15 would reduce the potential for injury, mortality, and the disruption of normal behaviors of  
16 individuals to less than significant. These impacts would be less than significant with mitigation  
17 because the aforementioned measures would (1) train construction staff on protecting least Bell's  
18 vireo, the requirements for avoiding impacts, and the ramifications for not following these  
19 measures; (2) minimize dust; (3) implement spill prevention and containment plans that would  
20 avoid material spills that could affect habitat; (4) prior to and during restoration and enhancement  
21 ground disturbance, establish protective buffers around occupied habitat; and (5) have a biological  
22 monitor present that would ensure that non-disturbance buffers are intact and avoidance measures  
23 for least Bell's vireo and all protective measures are being implemented where applicable.

24 Creation and enhancement of wetlands under the CMP have the potential to exacerbate  
25 bioaccumulation of mercury in least Bell's vireo by creating newly inundated wetlands which can  
26 produce the biogeochemical conditions to methylate mercury existing in Delta soils. Methylmercury  
27 can subsequently be transported to adjacent terrestrial foodwebs through ingestion of aquatic  
28 insects (Cristol et al. 2008:335). Potential effects of increased methylmercury exposure are likely  
29 low for least Bell's vireo because the species does not currently breed in the study area. Because  
30 Bouldin Island and the I-5 ponds sites consist of existing managed and agricultural wetlands and  
31 ponds, wetland creation and enhancement are not expected to increase mercury methylation,  
32 relative to existing conditions. Monitoring and adaptive management plans as described in the CMP  
33 (Appendix 3F, Section 3F.7.2) would include mercury monitoring and adaptive management at  
34 Bouldin Island and the I-5 ponds to prevent increased mercury methylation, relative to existing  
35 conditions. Mitigation Measure WQ-6: *Develop and Implement a Mercury Management and*  
36 *Monitoring Plan*, which contains measures to assess the amount of mercury at tidal restoration sites  
37 before project development, followed by appropriate design, monitoring, and adaptive  
38 management, would further minimize the potential for any effects of increased methylmercury  
39 exposure in adjacent riparian habitats. Therefore, implementation of the CMP would not be expected  
40 to have a significant adverse impact on least Bell's vireo.

41 Herbicides would be applied at CMP creation and enhancement sites to remove nonnative  
42 vegetation for site preparation and to support establishment of new plantings. Natural habitats  
43 contribute fewer pesticides to receiving waters than agricultural areas where pesticides are applied.  
44 Any newly created wetlands or enhanced natural habitat could also filter stormwater to remove  
45 solids and either improve or have no effect on pesticide concentrations in discharges to receiving  
46 waters, relative to existing conditions. As such, restoration areas are expected to somewhat reduce,

1 rather than increase, runoff of pesticides into adjacent waterbodies. Environmental Commitment  
2 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would ensure  
3 that herbicides would be applied in such a manner as to prevent primary or secondary poisoning of  
4 nesting special-status and least Bell's vireo.

5 Habitat creation and enhancement under the CMP has the potential to result in conditions that  
6 promote CHABs, which could result in impacts on least Bell's vireo. High levels of microcystins have  
7 been found in terrestrial foodwebs, such as spiders and songbirds in riparian habitats, likely through  
8 consumption of emergent aquatic insects (Moy et al. 2016:A, E), and could impact least Bell's vireo if  
9 they forage in or near habitats with conditions that promote CHABs. Monitoring and adaptive  
10 management plans as described in the CMP (Appendix 3F, Section 3F.7.2) would include CHAB  
11 monitoring and adaptive management at Bouldin Island and the I-5 ponds to prevent increased  
12 CHAB formation, relative to existing conditions. As discussed in Chapter 9, tidal habitat creation is  
13 not expected to cause substantial additional *Microcystis* production. Therefore, implementation of  
14 the CMP would not result in increased CHAB formation that could cause substantial adverse impacts  
15 on least Bell's vireo, relative to existing conditions.

16 CMP habitat creation and enhancement may result in mobilization of selenium in Delta sediments,  
17 which could increase the risk of selenium toxicity to least Bell's vireo. It is difficult to determine  
18 whether the effects of potential increases in selenium bioavailability associated with the CMP would  
19 lead to adverse effects. Potential effects of increased selenium exposure are likely low for least Bell's  
20 vireo because the species does not currently breed in the study area, existing selenium  
21 concentrations in the Sacramento River watershed are low (Central Valley Regional Water Quality  
22 Control Board 1988:14), and modeled concentrations in insect-eating bird eggs under existing  
23 conditions in the Delta were below levels of concern for other bird species (Appendix 9J), Analysis  
24 included in Chapter 9 for Impact WQ-10: *Effects on Selenium Resulting from Facility Operations* found  
25 that compensatory mitigation would not result in a measurable increase in selenium concentrations  
26 or selenium bioavailability. Should increases in selenium occur as a result of compensatory  
27 mitigation, such increases are not expected to negatively affect least Bell's vireo due to their low  
28 trophic position. Therefore, potential increased exposure to selenium resulting from restoration  
29 would not be expected to adversely affect least Bell's vireo populations. The impact on least Bell's  
30 vireo from the project with the CMP would be less than significant with mitigation.

### 31 Other Mitigation Measures

32 Some mitigation measures would involve ground disturbance, the use of heavy equipment, pile  
33 driving, or pesticides that would have the potential to expose least Bell's vireo to excessive noise,  
34 visual disturbance, dust, and hazardous materials that could cause loss of modeled habitat,  
35 disruption of normal behaviors, and injury or mortality. The mitigation measures with potential to  
36 result in impacts on least Bell's vireo are similar to those discussed under Impact BIO-31: *Impacts of*  
37 *the Project on Western Yellow-Billed Cuckoo*. Impacts on least Bell's vireo resulting from  
38 implementation of mitigation measures would be similar to construction effects of the project  
39 alternatives in certain construction areas and would contribute to least Bell's vireo impacts of the  
40 project alternatives.

41 The impacts of habitat loss, noise, visual disturbance, and exposure to dust or hazardous materials  
42 on least Bell's vireo would be reduced through the CMP, environmental commitments, and  
43 Mitigation Measure NOI-1: *Develop and Implement a Noise Control Plan* as detailed under Impact  
44 BIO-31: *Impacts of the Project on Western Yellow-Billed Cuckoo*. In addition, Mitigation Measure BIO-

1 42: *Conduct Surveys and Minimize Impacts on Least Bell's Vireo* would require species-specific  
 2 measures to reduce these impacts. Therefore, impacts on least Bell's vireo from implementation of  
 3 other mitigation measures would be reduced to less than significant.

4 Overall, the impacts on least Bell's vireo from construction of compensatory mitigation and  
 5 implementation of other mitigation measures, combined with project alternatives, would not change  
 6 the impact conclusion of less than significant with mitigation.

### 7 **Impact BIO-43: Impacts of the Project on Suisun Song Sparrow and Saltmarsh Common** 8 **Yellowthroat**

9 The methods for the analysis of effects on Suisun song sparrow and saltmarsh common yellowthroat  
 10 appear in Section 13.3.1.1, and information on the life histories and habitat suitability models are  
 11 presented in the following species accounts in Appendix 13B: Section 13B.82, *Suisun Song Sparrow*,  
 12 and Section 13B.86, *Saltmarsh Common Yellowthroat*.

### 13 ***All Project Alternatives***

#### 14 *Construction*

15 The construction of the proposed project alternatives would not affect Suisun song sparrow or  
 16 saltmarsh common yellowthroat (Table 13-90). The modeled habitat for these species depicted in  
 17 Figure 13B.82-1 and Figure 13B.86-1 is more than 11 miles from the nearest project infrastructure  
 18 and more than 14 miles from the nearest occurrences (California Department of Fish and Wildlife  
 19 2020a).

20 **Table 13-90. Impacts on Modeled Habitat for Suisun Song Sparrow and Saltmarsh Common**  
 21 **Yellowthroat by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
All Alternatives	0.00	0.00	0.00

22 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 23 discussion in Section 13.3.1.2.  
 24

#### 25 *Operations*

26 The operations of the water conveyance facilities under all project alternatives would not result in  
 27 impacts on Suisun song sparrow or saltmarsh common yellowthroat because of the distance of  
 28 modeled and known occupied habitat from the infrastructure and any affected Delta waterways.

29 Power for construction and operation of the conveyance facilities would not be placed in the vicinity  
 30 of modeled habitat for Suisun song sparrow or saltmarsh common yellowthroat and therefore  
 31 would not affect either species.

32 In general, the highest mercury methylation rates are associated with high tidal marshes that  
 33 experience intermittent wetting and drying and associated anoxic conditions (Alpers et al. 2008:15),  
 34 which are primary Suisun song sparrow and saltmarsh common yellowthroat habitat (Gardali and  
 35 Evens 2008:348; Takekawa et al. 2011:11). Water quality modeling results indicated that the project  
 36 alternatives would not result in substantial increases in total mercury and methylmercury  
 37 concentrations in Delta waters or in Delta outflows (Chapter 9). As such, the project alternatives

1 would not cause a substantial change in total mercury and methylmercury concentrations in Suisun  
2 Marsh, Suisun Bay, or San Francisco Bay under all project alternatives, relative to existing  
3 conditions. Methylmercury can be transported to terrestrial foodwebs through consumption of  
4 aquatic prey (Cristol et al. 2008:335), therefore changes in aquatic foodweb methylmercury  
5 concentrations are assumed to result in changes in adjacent terrestrial foodwebs. The lack of  
6 substantial change in water column mercury concentrations indicates that methylmercury  
7 transported to tidal marsh foodwebs would also not increase appreciably; therefore, these results  
8 indicate that bioavailability of methylmercury to Suisun song sparrow or saltmarsh common  
9 yellowthroat would not measurably increase as a result of project operation.

10 Microcystin toxins originate in aquatic systems and can be transported through foodwebs through  
11 consumption (Moy et al. 2016:A). Operation of all project alternatives is not expected to  
12 substantially change the five factors that could create conditions more conducive to CHAB formation  
13 (i.e., temperature, residence time, nutrients, water velocities and associated turbulence and mixing,  
14 and water clarity and associated irradiance) relative to existing conditions in Suisun Marsh or  
15 Suisun Bay (Chapter 9). The water quality modeling results show a potential for increased residence  
16 time in some locations and months within the central Delta, namely Discovery Bay where residence  
17 times are already very long, which could contribute to increased *Microcystis* bloom size in some  
18 years at these locations if the remaining four environmental factors were also at levels conducive to  
19 forming CHABs. These locations are outside of the range of Suisun song sparrow and saltmarsh  
20 common yellowthroat, and, based on known *Microcystis* dynamics in the Delta a small increase of  
21 residence time at Discovery Bay would not cause *Microcystis* blooms to substantially increase in size  
22 or last substantially longer, relative to existing conditions. Because the project alternatives, through  
23 their effects on the five factors potentially associated with CHABs in the Delta, are not expected to  
24 cause Delta CHABs to be substantially larger in size, and because bloom size does not necessarily  
25 dictate toxin concentration in the water, the project alternatives are not expected to substantially  
26 increase microcystin or any other cyanotoxins in the Delta that could cause a substantial adverse  
27 impact on Suisun song sparrow and saltmarsh common yellowthroat, relative to existing conditions.

28 Current use and legacy pesticides have the potential to bioaccumulate in the food items of birds such  
29 as Suisun song sparrow and saltmarsh common yellowthroat. Operation of all project alternatives  
30 and potential runoff from project facilities would not result in substantial increases in pesticide  
31 concentrations in Delta waters or in Delta outflows, relative to existing conditions (Chapter 9).  
32 Moreover, project alternatives would not change land use practices or the extent of pesticide use  
33 within and around the Suisun Marsh, Suisun Bay, San Francisco Bay, or SWP/CVP export service  
34 area waterbodies, relative to existing conditions. Consequently, the project alternatives would not  
35 substantially affect pesticide runoff from surrounding lands directly into these waterbodies. As such,  
36 there would not be a substantial change in pesticide concentrations in Suisun Marsh, Suisun Bay,  
37 San Francisco Bay, or within the SWP/CVP export service areas under all project alternatives,  
38 relative to existing conditions. Therefore, the project alternatives would not substantially increase  
39 pesticide exposure to Suisun song sparrow or saltmarsh common yellowthroat.

40 Because Suisun song sparrow and saltmarsh common yellowthroat are obligate wetland species,  
41 they may be at risk of selenium toxicity. Water quality modeling results indicated that the project  
42 alternatives would not result in substantial increases in selenium concentrations in Delta waters or  
43 in Delta outflows (Chapter 9). As such, the project alternatives would not cause a substantial change  
44 in selenium concentrations in Suisun Marsh, Suisun Bay, or San Francisco Bay under all project  
45 alternatives, relative to existing conditions. Therefore, the project alternatives are not anticipated to

1 substantially increase the risk of selenium contamination in Suisun song sparrow or saltmarsh  
2 common yellowthroat.

### 3 Maintenance

4 The maintenance of the water conveyance facilities under all project alternatives would not result in  
5 impacts on Suisun song sparrow or saltmarsh common yellowthroat due to the distance of modeled  
6 and known occupied habitat from the infrastructure and any affected Delta waterways.

### 7 **CEQA Conclusion—All Project Alternatives**

8 Construction and maintenance of all project alternatives would result in no impact on Suisun song  
9 sparrow and saltmarsh common yellowthroat because no modeled or known habitat for this species  
10 occurs in the vicinity of project construction, operations, or maintenance areas. For all project  
11 alternatives, changes in water operations would not be expected to result in a measurable increase  
12 in mercury or selenium bioavailability or increased exposure to pesticides to Suisun song sparrow  
13 or saltmarsh common yellowthroat. Therefore, project operations would result in no impact on  
14 Suisun song sparrow and saltmarsh common yellowthroat.

### 15 **Mitigation Measure CMP: Compensatory Mitigation Plan**

16 None of the measures in the CMP (Appendix 3F) would specifically benefit Suisun song sparrow  
17 or saltmarsh common yellowthroat because the locations of compensatory mitigation sites are  
18 outside of the known species ranges.

### 19 **Mitigation Impacts**

20 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
21 mitigation measure impacts. The analyses below consider the potential impacts associated with  
22 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
23 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
24 *Measures*.

### 25 Compensatory Mitigation

26 The implementation of the CMP would not result in impacts on Suisun song sparrow or saltmarsh  
27 common yellowthroat and none of the measures in the plan would specifically benefit these species  
28 because Bouldin Island and the I-5 ponds, the locations of where tidal wetland habitat restoration  
29 and channel margin enhancement, non-bank locations, and site protection instruments could occur  
30 are outside of the known species ranges (Appendix 3F, Section 3F.4.3.4.2, *Site Selection Criteria and*  
31 *Tools*).

### 32 Other Mitigation Measures

33 Other mitigation measures proposed would not have impacts on Suisun song sparrow or saltmarsh  
34 common yellowthroat because the modeled habitat for these species depicted in Figure 13B.82-1  
35 and Figure 13B.86-1 is more than 11 miles from the nearest project infrastructure and more than 14  
36 miles from the nearest occurrences (California Department of Fish and Wildlife 2020a).

1 Overall, the construction of compensatory mitigation and implementation of other mitigation  
2 measures, combined with project alternatives, would not affect Suisun song sparrow and saltmarsh  
3 common yellowthroat and would not change the impact conclusion of no impact.

#### 4 **Impact BIO-44: Impacts of the Project on Tricolored Blackbird**

5 The methods for the analysis of effects on tricolored blackbird appear in Section 13.3.1.1, and  
6 information on the species life history and habitat suitability model are presented in the species  
7 account for tricolored blackbird (Appendix 13B, Section 13B.85, *Tricolored Blackbird*).

#### 8 ***All Project Alternatives***

##### 9 *Construction*

10 The construction of all project alternatives would affect modeled habitat for tricolored blackbird.  
11 Construction effects would include the permanent and temporary loss of modeled potentially  
12 suitable nesting habitat and modeled foraging habitat, and the potential for injury, mortality, and the  
13 disruption of normal behaviors.

14 Based upon recent survey results, tricolored blackbird appears to be an uncommon breeder in the  
15 Delta (California Department of Fish and Wildlife 2020a; Meese pers. comm.) and historical nesting  
16 activity was generally restricted to the northern and southern ends of the Delta (California  
17 Department of Fish and Wildlife 2020a). The Delta is recognized as an important wintering area for  
18 tricolored blackbirds (Hamilton 2004:11; Beedy 2008:438), and suitable nesting habitat may also be  
19 used for roosting during the nonbreeding season (August 1 through March 14). There would be no  
20 permanent or temporary loss of previously occupied colony habitat (active colony within the past  
21 15 years) under any project alternative and there is minimal previously occupied colony habitat in  
22 the vicinity of project facilities. Previously occupied colony habitat (associated with CNDDDB  
23 occurrence #480; California Department of Fish and Wildlife 2020a) would occur adjacent the  
24 construction of a road and associated work areas between Intakes A and B (Alternatives 2a and 4a).  
25 The next nearest previously occupied colony habitat (associated with CNDDDB occurrence #369;  
26 California Department of Fish and Wildlife 2020a) to project facilities is approximately 450 feet  
27 from a new access road that would be constructed southeast of the Bethany Reservoir (Alternative  
28 5). Previously occupied colony habitat (associated with CNDDDB occurrence #593; California  
29 Department of Fish and Wildlife 2020a) is located approximately 2,018 feet from the Southern  
30 Forebay Outlet and Control Structure and associated work areas (Alternatives, 1, 2a, 2b, 2c, 3, 4a, 4b,  
31 and 4c).

32 Loss of potentially suitable nesting habitat would occur primarily from the construction of levee  
33 improvements areas on Bouldin Island (Alternatives 1, 2a, 2b, and 2c) and on Lower Roberts Island  
34 (Alternatives 3, 4a, 4b, 4c, and 5; Appendix 13C). Suitable nesting habitat also meets habitat criteria  
35 for nighttime roosting habitat during the nonbreeding season (August 1 through March 14) and thus  
36 roosting birds could potentially be affected by construction in these areas. Loss of foraging habitat  
37 would occur primarily from the construction of the Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3,  
38 4a, 4b, and 4c) and the placement of RTM (all alternatives). Additional foraging habitat would be  
39 removed for the construction of the shafts and from levee and road improvements throughout the  
40 central alignment (Alternatives 1, 2a, 2b, and 2c), eastern alignment (Alternatives 3, 4, 4b, and 4c),  
41 and Bethany Reservoir alignment (Alternative 5) (Appendix 13C). Acres of permanent and  
42 temporary impacts on modeled habitat for tricolored blackbird are shown in Table 13-91.



1 Environmental Commitment EC-14: *Construction Best Management Practices for Special-Status*  
 2 *Species* would ensure that temporarily disturbed areas are restored (Appendix 3B).

3 **Table 13-91. Impacts on Modeled Habitat for Tricolored Blackbird by Alternative**

Alternative	Permanent Impacts— Previously Occupied Colony (acres) <sup>a</sup>	Permanent Impacts— Potential Nesting (acres) <sup>a</sup>	Permanent Impacts— Foraging (acres) <sup>a</sup>	Temporary Impacts— Previously Occupied Colony (acres)	Temporary Impacts— Potential Nesting (acres)	Temporary Impacts— Foraging (acres)	Total (acres)
1	0.00	8.25	2,570.04	0.00	7.32	318.31	2,903.92
2a	0.00	7.10	2,765.26	0.00	8.74	355.73	3,136.83
2b	0.00	6.37	2,303.28	0.00	8.39	345.45	2,663.49
2c	0.00	6.59	2,442.16	0.00	8.74	353.50	2,810.99
3	0.00	0.90	2,314.68	0.00	1.89	290.63	2,608.10
4a	0.00	1.41	2,590.01	0.00	1.89	294.55	2,887.86
4b	0.00	0.68	2,017.82	0.00	1.53	284.17	2,304.20
4c	0.00	0.90	2,194.71	0.00	1.89	292.24	2,489.74
5	0.00	1.76	1,526.47	0.00	1.76	152.99	1,682.98

4 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 5 discussion in Section 13.3.1.2.  
 6

7 Operation of construction equipment could result in injury or mortality of tricolored blackbirds.  
 8 Risk of injury or mortality would be greatest to eggs and nestlings, which are susceptible to land-  
 9 clearing activities, nest abandonment, or increased exposure to the elements or to predators. Injury  
 10 to adults and fledged juveniles is less likely as these individuals are mobile and have the ability to  
 11 avoid contact with construction equipment. If tricolored blackbird nest in or adjacent to work areas,  
 12 construction-related noise and visual disturbances during the breeding season (March 15 through  
 13 July 31), including pile driving, helicopters, and human presence, could mask calls, disrupt foraging  
 14 and nesting behaviors, and reduce the functions of nesting habitat for the species such that  
 15 individuals experience reduced survivability or abandon nests. Roosting tricolored blackbirds could  
 16 be injured or killed by nighttime construction activities conducted during the nonbreeding season  
 17 (August 1 through March 14). Nighttime noise, light or visual disturbances could also cause altered  
 18 behavior or abandonment of nighttime roosts. All lights used during nighttime construction would  
 19 be downcast, cut-off type fixtures with non-glare finishes, natural light qualities, and minimum  
 20 intensity. Construction-related lighting would be shielded and oriented in such a manner so as not to  
 21 subject the immediate surroundings to extremes in the levels of light; however, these types of light  
 22 generate an ambient nighttime luminescence that is visible from a distance. Effects of construction-  
 23 related light would be greater at the intakes where existing conditions are dark and rural in  
 24 comparison with the Twin Cities Complex, Southern Complex, and Bethany Complex where there are  
 25 existing sources of light that may illuminate suitable habitat. Construction activities could result in  
 26 dust and the discharge of construction-related fluids, which could also affect tricolored blackbird, if  
 27 present in or adjacent to work areas, and result in degradation of nesting, roosting, or foraging  
 28 habitat. Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
 29 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
 30 *Containment, and Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best*

1 *Management Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts  
2 by (1) training construction staff on protecting nesting tricolored blackbirds, reporting  
3 requirements, and the ramifications for not following these measures; (2) implementing spill  
4 prevention and containment plans that would avoid material spills that could affect suitable habitat;  
5 and (3) having a biological monitor present that would ensure that non-disturbance buffers are  
6 intact and all protective measures are being implemented, where applicable.

7 There are no known tricolored blackbird occurrences from the CNDDDB (California Department of  
8 Fish and Wildlife 2020a) or the Tricolored Blackbird Portal (Meese pers. comm.) that overlap with  
9 permanent or temporary construction footprints for any of the project alternatives. The proximity of  
10 known occurrences (CNDDDB occurrences #480, #369, and #593, California Department of Fish and  
11 Wildlife 2020a) within the study area in relation to previously occupied colony habitat is discussed  
12 above.

13 Field investigations would be conducted prior to and during construction under all project  
14 alternatives to more specifically identify appropriate construction methods and design criteria  
15 addressed in the final design documents, verify soil rehabilitation methods, confirm the locations of  
16 existing utilities, and address the establishment of geological and groundwater monitoring  
17 programs (Delta Conveyance Design and Construction Authority 2022a, 2022b). Field investigations  
18 would involve a variety of ground-disturbing activities that would vary in duration from several  
19 hours to approximately 6 weeks (Section 3.15; Delta Conveyance Design and Construction Authority  
20 2022a, 2022b) and could result in impacts on habitat and the potential for injury, mortality, and the  
21 disruption of normal nesting and foraging behaviors of tricolored blackbird. Geotechnical  
22 investigations associated with the tunnels under all project alternatives, which include CPTs and soil  
23 borings, would result in impacts on modeled habitat (Appendix 13C). The West Tracy Fault  
24 investigations would not affect previously occupied colony habitat or potential nesting habitat, but  
25 they would occur within modeled foraging habitat for tricolored blackbird. The Bethany Fault Study  
26 geotechnical investigations (Alternative 5) would be completed in a single day and would involve  
27 placing approximately 20 ERT probes 0.5 inch in diameter. The study would be conducted entirely  
28 on foot, perpendicular to the tunneled portion of the Bethany Reservoir Aqueduct (Delta  
29 Conveyance Design and Construction Authority 2022a, 2022b). The Bethany Fault Study could result  
30 in minor disruption of normal behaviors, but because of its small footprint and the short (1-day)  
31 duration of the disturbance, impacts on modeled habitat are not quantified and are considered  
32 negligible. The following field investigations would be conducted within proposed surface  
33 construction footprints of project facilities (including portions of tunnel alignments) and would  
34 temporarily affect habitat: test trenches, CPTs, soil borings, ERT, groundwater testing and  
35 monitoring, monument installation, pilot studies for settlement, agronomic testing, and utility  
36 potholing. These temporary impacts are not characterized as an additional loss of habitat because  
37 impacts for these locations have already been quantified within the construction-related footprints  
38 but could still result in the potential for injury, mortality, and disruption of normal nesting and  
39 foraging behaviors of tricolored blackbird if present in the vicinity, as discussed above for  
40 conveyance facility construction. While these impact mechanisms are present, the likelihood of  
41 injury or mortality of tricolored blackbird from field investigations is low given the small number of  
42 breeding colonies currently in the Delta. Environmental Commitments EC-1: *Conduct Worker*  
43 *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
44 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
45 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce these  
46 potential impacts by (1) training construction staff on protecting nesting tricolored blackbirds,

1 reporting requirements, and the ramifications for not following these measures; (2) implementing  
2 spill prevention and containment plans that would avoid material spills that could affect suitable  
3 habitat; and (3) having a biological monitor present that would ensure that non-disturbance buffers  
4 are intact and all protective measures are being implemented, where applicable. Noise and visual  
5 disturbances from helicopter surveys to identify buried groundwater and natural gas wells  
6 throughout the project area may also cause disturbance to tricolored blackbirds, as described above  
7 under construction-related effects. Field investigations would occur during daylight hours and  
8 therefore would not affect roosting tricolored blackbirds if roost sites are present.

### 9 Operations

10 The operation of project facilities would not require ground disturbance or result in additional  
11 habitat loss, but project operations would generate small levels of noise, have permanent light  
12 sources, and require the periodic presence of staff and vehicle traffic. Noise from the operation of  
13 the water conveyance facilities would not be discernably higher than existing conditions (Chapter  
14 24, Section 24.4.3.2). The periodic presence of staff and vehicle traffic at project facilities would not  
15 be expected to significantly alter the behavior of tricolored blackbird if present in the vicinity.  
16 Permanent facility lighting associated with project facilities under all alternatives could extend into  
17 tricolored blackbird foraging habitat and facility lighting for the Southern Complex (Alternatives 1,  
18 2a, 2b, 2c, 3, 4a, 4b, and 4c) could extend into potentially suitable nesting habitat, which could affect  
19 the behavior of individuals, as described above under construction-related effects; however, as  
20 stated in Chapter 3, Section 3.4.12, permanent lighting at project facilities would be motion  
21 activated, downcast, cut-off type fixtures with non-glare finishes, and therefore permanent facilities  
22 would remain dark the majority of the time at night, which would minimize the potential for this  
23 impact.

24 Power for construction and operation of the conveyance facilities has been designed to use existing  
25 power lines and underground conduit to the extent possible under all project alternatives. Most new  
26 project lines would be placed on existing poles and towers and therefore would not substantially  
27 alter the existing landscape. However, new aboveground high-voltage transmission and SCADA lines  
28 would be constructed to power the Southern Complex (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c)  
29 and the Bethany Complex under Alternative 5 (Chapter 3, Figure 3-13 and Figure 3-14). The new  
30 transmission lines overlap with patches of modeled foraging habitat potential nesting habitat in the  
31 vicinity of Discovery Bay and Clifton Court Forebay and one tricolored blackbird colony has been  
32 recorded within the past 15 years (occurrence # 369; California Department of Fish and Wildlife  
33 2020a) within 2.5 miles of these new lines. Tricolored blackbirds would have the highest risk of  
34 collision the proposed transmission lines during winter movements throughout the study area,  
35 when individuals are migrating in large flocks and dense fog is common. Migratory movements and  
36 daily flights between roosting and foraging habitat make tricolored blackbird vulnerable to collision  
37 with transmission lines. Tricolored blackbirds are considered strong and agile flyers with moderate  
38 maneuverability (i.e., low wing loading/low aspect ratio) (Beedy et al. 2020) and therefore are  
39 physically equipped to avoid collision with power lines. However, tricolored blackbird are known to  
40 form large flocks which locking increases collision risk compared to non-flocking species because of  
41 decreased visibility for birds flying at the rear of the flock (Murphy et al. 2009:18; Jenkins et al.  
42 2010:10; Avian Power Line Interaction Committee 2012:37; Murphy et al. 2016b:315).  
43 Transmission line poles and towers also provide perching substrate for raptors, which prey on  
44 tricolored blackbird. The existing network of transmission lines in the study area currently poses

1 these risks and any incremental risk associated with the new power line corridors would not be  
2 expected to affect the study area population.

3 Changes in water operations under all project alternatives is not expected to affect tricolored  
4 blackbird habitat, but there is some potential to exacerbate bioaccumulation of mercury in  
5 tricolored blackbird because mercury can be transported to terrestrial foodwebs (Cristol et al.  
6 2008:335). Largemouth bass was used as an indicator species for analysis of impacts from changes  
7 in operations due to the project alternatives because they are good indicators of mercury  
8 contamination throughout the aquatic foodweb (Wood et al. 2010:67). Although the magnitude of  
9 methylmercury bioaccumulation differs among species and foodwebs, methylmercury can be  
10 transported to terrestrial foodwebs through consumption of aquatic prey (Cristol et al. 2008:335);  
11 therefore, changes in aquatic foodweb methylmercury concentrations are assumed to result in  
12 changes in adjacent terrestrial foodwebs. The modeled effects of mercury concentrations from  
13 changes in water operations on largemouth bass did not differ substantially from existing conditions  
14 (Appendix 9H); therefore, these results also indicate tricolored blackbird mercury exposure would  
15 not measurably increase as a result of project operations.

16 Microcystin toxins originate in aquatic systems and can be transported through foodwebs through  
17 consumption (Moy et al. 2016:A) and can affect tricolored blackbirds if they forage near aquatic  
18 habitats with conditions that promote formation of CHABs. Operation of all project alternatives is  
19 not expected to substantially change the five factors that could create conditions more conducive to  
20 CHAB formation (i.e., temperature, residence time, nutrients, water velocities and associated  
21 turbulence and mixing, and water clarity and associated irradiance) relative to existing conditions  
22 within the Delta (Chapter 9). The water quality modeling results show a potential for increased  
23 residence time in some locations and months within the central Delta, namely Discovery Bay where  
24 residence times are already very long, which could contribute to increased *Microcystis* bloom size in  
25 some years at these locations if the remaining four environmental factors were also at levels  
26 conducive to forming CHABs. Nevertheless, based on known *Microcystis* dynamics in the Delta a  
27 small increase of residence time at Discovery Bay would not cause *Microcystis* blooms to  
28 substantially increase in size or last substantially longer, relative to existing conditions. Because the  
29 project alternatives, through their effects on the five factors potentially associated with CHABs in the  
30 Delta, are not expected to cause Delta CHABs to be substantially larger in size, and because bloom  
31 size does not necessarily dictate toxin concentration in the water, the project alternatives are not  
32 expected to substantially increase microcystin or any other cyanotoxins in the Delta that could cause  
33 a substantial adverse impact on tricolored blackbird, relative to existing conditions.

34 Current use and legacy pesticides have the potential to bioaccumulate in the food items of tricolored  
35 blackbird. Impacts of all project alternatives on pesticides in the Delta were analyzed in Chapter 9.  
36 Operation of all project alternatives and potential runoff from project facilities would not result in  
37 substantial increases in pesticide concentrations in Delta waters or in Delta outflows, and would not  
38 result in land-use changes that would increase use of pesticides in habitats used by tricolored  
39 blackbirds, relative to existing conditions. Therefore, the project alternatives would not  
40 substantially reduce prey availability or increase pesticide exposure to tricolored blackbird.

41 Changes in water operations under all project alternatives is not expected to affect tricolored  
42 blackbird habitat, but there is some potential to exacerbate bioaccumulation of selenium in  
43 tricolored blackbird because selenium can be transported to terrestrial foodwebs. Modeled  
44 selenium concentrations in the eggs of insect-eating birds, such as tricolored blackbird, were below  
45 the level of concern and did not differ substantially from existing conditions under all alternatives

1 (Appendix 9J). Therefore, the project alternatives are not anticipated to substantially increase the  
2 risk of selenium contamination in tricolored blackbird.

### 3 Maintenance

4 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
5 in periodic disturbances that could affect tricolored blackbird. Maintenance activities across all  
6 facilities that could affect tricolored blackbird include repaving of access roads every 15 years,  
7 semiannual general and ground maintenance (e.g., mowing, vegetation trimming, herbicide  
8 application), and daily or weekly inspections by vehicle. Maintenance activities at launch and  
9 maintenance shafts along the central alignment (Alternatives 1, 2a, 2b, and 2c), eastern alignment  
10 (Alternatives 3, 4a, 4b, and 4c), and Bethany Reservoir alignment (Alternative 5) would include  
11 similar semiannual general and ground maintenance in addition to daily inspections by vehicle.  
12 Maintenance activities at all project facilities including human presence, could create noise and  
13 visual disturbance that could disrupt normal foraging behavior, cause loss or injury of eggs or  
14 nestlings, or cause collision-related mortality. Maintenance-related accidental discharge of  
15 contaminants or the use of herbicides, and pesticides within suitable habitat could expose tricolored  
16 blackbird (and/or their prey) to toxic materials could result in injury and mortality of individuals as  
17 well as lead to habitat degradation. Maintenance activities would generally be conducted during the  
18 day, except for emergency maintenance, and would therefore not require additional lighting, or  
19 affect roosting tricolored blackbirds during the nonbreeding season (August 1 through March 14) if  
20 roost sites are present.

### 21 **CEQA Conclusion—All Project Alternatives**

22 Construction, operations, and maintenance of the water conveyance facilities under all project  
23 alternatives would result in impacts on tricolored blackbird through the permanent and temporary  
24 loss of modeled habitat of a special-status species and the potential for injury, mortality, and the  
25 disruption of normal behaviors. While these impact mechanisms are present, the likelihood of injury  
26 or mortality of nesting tricolored blackbirds is low given the small number of breeding colonies  
27 currently in the Delta. Suitable nesting habitat also meets habitat criteria for nighttime roosting  
28 habitat and thus roosting birds could potentially be affected by nighttime construction occurring  
29 during the nonbreeding season. For all project alternatives, changes in water operations would not  
30 be expected to result in a measurable increase in mercury or selenium bioavailability or increased  
31 exposure to pesticides or microcystins on tricolored blackbird. The temporary impacts on habitat  
32 and potential impacts of injury, mortality, or disruption of normal behaviors from project  
33 construction, operations, and maintenance activities would be reduced by Environmental  
34 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
35 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
36 *Countermeasure Plans*; EC-11: *Fugitive Dust Control*; and EC-14: *Construction Best Management*  
37 *Practices for Special-Status Species* (Appendix 3B); however, even with these commitments, the  
38 impacts of the project alternatives on tricolored blackbird would be significant. The CMP would be  
39 required to offset the loss of previously occupied (occupied within the last 15 years) or occupied  
40 nesting habitat by protecting tricolored blackbird colonies and associated foraging habitat  
41 (Appendix 3F, Table 3F.1-3, CMP-22a: *Tricolored Blackbird Nesting Habitat*, CMP-22b: *Tricolored*  
42 *Blackbird Foraging Habitat*), which would mitigate the loss of tricolored blackbird previously  
43 occupied (occupied within the last 15 years) or occupied nesting habitat to a less-than-significant  
44 level. The CMP also includes creation or enhancement of valley/foothill riparian, nontidal

1 freshwater emergent wetland, and pond habitat on Bouldin Island (Appendix 3F, Section 3F.4.1.3)  
2 and the I-5 ponds (Appendix 3F, Section 3F.4.1.4) and tidal restoration activities which would  
3 include channel margin enhancement (Appendix 3F, Section 3F.4.3.2.1) and tidal emergent wetland  
4 habitat restoration (Appendix 3F, Section 3F.4.3.2.3) some of which may also provide suitable  
5 nesting and roosting habitat for tricolored blackbird. The upland grassland components of the  
6 Bouldin Island (Appendix 3F, Section 3F.4.1.3) and I-5 ponds (Appendix 3F, Section 3F.4.1.4) created  
7 or enhanced wetlands and the compensation for loss of Swainson's hawk foraging habitat  
8 (Attachment 3F.1, Table 3F.1-3, CMP-19b: *Swainson's Hawk Foraging Habitat*) would also provide  
9 suitable foraging habitat for tricolored blackbird. Mitigation Measures AES-4b: *Minimize Fugitive*  
10 *Light from Portable Sources Used for Construction*; AES-4c: *Install Visual Barriers along Access Routes,*  
11 *Where Necessary, to Prevent Light Spill from Truck Headlights toward Residences* (Chapter 18); NOI-  
12 *1: Develop and Implement a Noise Control Plan* (Chapter 24); BIO-2b: *Avoid and Minimize Impacts on*  
13 *Biological Resources from Maintenance Activities*; BIO-2c: *Electrical Power Line Support Placement*;  
14 and BIO-44: *Conduct Preconstruction Surveys and Implement Protective Measures to Avoid*  
15 *Disturbance of Tricolored Blackbird* would be required to avoid and minimize the potential for  
16 injury, mortality, or the disruption of normal nesting, roosting, and foraging behaviors and  
17 disturbances to habitat. The impacts on tricolored blackbird from the project alternatives would be  
18 less than significant with mitigation because the aforementioned measures would replace lost  
19 habitat, reduce direct effects on the species, including habitat, noise, and visual disturbances, by  
20 providing environmental awareness training to construction personnel, by implementing protective  
21 measures during maintenance activities, and avoidance measures for tricolored blackbird during  
22 construction.

### 23 **Mitigation Measure CMP: Compensatory Mitigation Plan**

24 The CMP (see Impact BIO-1 for a summary discussion of the CMP) would offset the loss of  
25 tricolored blackbird previously occupied colony habitat (occupied in the last 15 years) and  
26 occupied nesting habitat by protecting tricolored blackbird colonies or by restoring and  
27 managing nesting habitat (Appendix 3F, Attachment 3F.1, Table 3F.1-3, CMP-22a: *Tricolored*  
28 *Blackbird Nesting Habitat*) and associated foraging habitat (Appendix 3F, Attachment 3F.1, Table  
29 3F.1-3, CMP-22b: *Tricolored Blackbird Foraging Habitat*). Protection or restoration of tricolored  
30 blackbird nesting and foraging habitat would occur at the I-5 pond mitigation sites or on  
31 Bouldin Island, or at another location subject to CDFW approval. Although no mitigation is  
32 specifically proposed for tricolored blackbird suitable nesting habitat (which also provides  
33 suitable habitat for nonbreeding night roosts), the CMP also includes creation or enhancement  
34 of valley/foothill riparian, nontidal freshwater emergent wetland, and pond habitat on Bouldin  
35 Island (Appendix 3F, Section 3F.4.1.3) and the I-5 ponds (Appendix 3F, Section 3F.4.1.4) and  
36 tidal restoration activities which would include channel margin enhancement (Appendix 3F,  
37 Section 3F.4.3.2.1) and tidal emergent wetland habitat restoration (Appendix 3F, Section  
38 3F.4.3.2.3) some of which may also provide suitable nesting and roosting habitat for tricolored  
39 blackbird. The upland grassland components of the Bouldin Island (Appendix 3F, Section  
40 3F.4.1.3) and I-5 ponds (Appendix 3F, Section 3F.4.1.4) created or enhanced wetlands and the  
41 compensation for loss of Swainson's hawk foraging habitat (Attachment 3F.1, Table 3F.1-3,  
42 CMP-19b: *Swainson's Hawk Foraging Habitat*) would also provide suitable foraging habitat for  
43 tricolored blackbird.

1       **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for**  
2       **Construction**

3       See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

4       **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary,**  
5       **to Prevent Light Spill from Truck Headlights toward Residences**

6       See description of Mitigation Measure AES-4c under Impact AES-4 in Chapter 18.

7       **Mitigation Measure NOI-1: Develop and Implement a Noise Control Plan**

8       See description of Mitigation Measure NOI-1 under Impact NOI-1 in Chapter 24.

9       **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
10       **Resources from Maintenance Activities**

11       See description of Mitigation Measure BIO-2b under Impact BIO-2.

12       **Mitigation Measure BIO-2c: Electrical Power Line Support Placement**

13       See description of Mitigation Measure BIO-2c under Impact BIO-2.

14       **Mitigation Measure BIO-44: Conduct Preconstruction Surveys and Implement Protective**  
15       **Measures to Avoid Disturbance of Tricolored Blackbird**

16       *All Project Alternatives*

17       The following measures will be required to avoid disturbance of tricolored blackbird.

18       1. Preconstruction Surveys.

- 19           a. Nesting. Prior to construction, DWR will contact the UC Davis Tricolored Blackbird  
20           Portal Project staff, or another group as recommended by CDFW, to acquire recent  
21           colony information. Prior to initiation of construction in area given work area and  
22           within 1,300 feet (396 meters) of the work area, the CDFW-approved biologist(s) will  
23           conduct preconstruction surveys to evaluate the presence of tricolored blackbird  
24           breeding colonies and suitable nesting habitat. Surveys will be conducted during the  
25           breeding season (March 15 through July 31) 1 year prior to, and then again in the year  
26           of, construction. During each year, surveys will be conducted monthly in March, April,  
27           May, June, and July. If construction is initiated during the breeding season, the CDFW-  
28           approved biologist(s) will conduct three surveys within 15 days of construction, with  
29           one of the surveys within 5 days of the start of construction. If there is a break in  
30           construction of 1 week or more, surveys will be conducted prior to starting construction  
31           again in the area. DWR will use a breeding season survey protocol approved in writing  
32           by CDFW. The CDFW-approved biologist(s) will delineate suitable nesting habitat and  
33           breeding colonies with flagging or other visible marking. If active tricolored blackbird  
34           nesting colonies are identified, the following avoidance measures will be implemented.
- 35           b. Roosting. Prior to initiation of nighttime construction activities (30 minutes before  
36           sunset to 30 minutes after sunrise) within 300 feet of a construction site, the CDFW-  
37           approved biologist(s) will conduct preconstruction surveys to establish the existence  
38           and use of roosting habitat by tricolored blackbird. Surveys will be conducted during the

1 nonbreeding season (August 1 through March 14) the year of construction. If nighttime  
2 construction is initiated at a site during the nonbreeding season, the CDFW-approved  
3 biologist(s) will conduct three surveys within 15 days prior to the nighttime  
4 construction, with one of the surveys within 5 days prior to the start of the nighttime  
5 construction. DWR will use a roosting survey protocol approved in writing by CDFW.  
6 DWR will consider roosting habitat occupied by large mixed blackbird flocks to be  
7 occupied by tricolored blackbird if the CDFW-approved biologist(s) cannot clearly  
8 identify tricolored blackbird presence within the flock. During nighttime construction  
9 activities (30 minutes before sunset to 30 minutes after sunrise), the CDFW-approved  
10 biologist(s) will check suitable roost sites within 300 feet of construction areas that are  
11 not occupied at the time of preconstruction surveys each day throughout the  
12 nonbreeding season, in accordance with the roosting survey protocol approved by  
13 CDFW, to determine whether tricolored blackbird later occupy the roost site.

- 14 2. No-Activity Buffer for Breeding. DWR will ensure construction avoids suitable nesting  
15 habitat within 1,300 feet, to the extent practicable. If nesting habitat cannot be avoided and  
16 a tricolored blackbird breeding colony is detected, DWR will ensure construction does not  
17 occur within a 1,300-foot diameter no-activity buffer surrounding the colony and associated  
18 habitat during the breeding season (March 15 through July 31). The no-activity buffer may  
19 be reduced to a minimum of 300 feet (91 meters), with written approval from CDFW, in  
20 areas with dense forest, buildings, or other features between the construction and the  
21 breeding colony, where there is sufficient topographic relief to protect the colony from  
22 excessive noise or visual disturbance; or where sound curtains have been installed. If  
23 tricolored blackbird colonizes habitat adjacent to construction after they have been  
24 initiated, DWR will reduce disturbance through establishment of no-activity buffers or  
25 sound curtains, as determined in consultation with CDFW.
- 26 3. Night Work. DWR will restrict construction to 30 minutes after sunrise to 30 minutes before  
27 sunset if occurring within 1,300 feet (396 meters) of a breeding colony occupied by  
28 tricolored blackbird to the extent feasible.
- 29 4. Daily Monitoring. Where access allows, the CDFW-approved biologist(s) will monitor  
30 breeding colonies that are within 1,300 feet (396 meters) of construction for at least 6 hours  
31 per day, to verify that construction is not disrupting the colony. If the Designated  
32 Biologist(s) determines that construction is causing a disruption to the colony, the CDFW-  
33 approved biologist(s) will have the authority to stop construction and will notify DWR  
34 immediately. The DWR Representative will notify CDFW within 24 hours to determine  
35 additional protective measures that can be implemented. The CDFW-approved biologist(s)  
36 will have the authority to:
  - 37 a. Stop construction activities that are resulting in the disturbance until additional  
38 protective measures are implemented, unless tricolored blackbird breeding behavior  
39 normalizes on its own.
  - 40 b. Continue monitoring and ensure additional protective measures will remain in place for  
41 the duration of construction.
  - 42 c. Determine if additional protective measures are ineffective and stop construction as  
43 needed until the additional protective measures are modified.
  - 44 d. Maintain additional protective measures until the CDFW-approved biologist determines  
45 tricolored blackbird behavior has normalized and continue monitoring.



1 Additional protective measures may include, but are not limited to, increasing the size of the  
2 buffer, delaying construction until the colony is finished breeding and chicks have left the  
3 nest site, temporarily relocating staging areas, and temporarily rerouting access to the  
4 construction site. The CDFW-approved biologist(s) will notify CDFW within 24 hours if nests  
5 or nestlings are abandoned. If the nestlings are still alive, the CDFW-approved biologist (s)  
6 will work with CDFW to determine appropriate actions. Notification to CDFW will be via  
7 telephone or email, followed by a written incident report. Notification will include the date,  
8 time, location, and circumstances of the incident.

- 9 5. No-Activity Buffer for Roosting. DWR will not conduct nighttime construction (30 minutes  
10 before sunset to 30 minutes after sunrise) within a 300-foot no-activity buffer surrounding  
11 the roost site (no-activity buffer). The no-activity buffer may be modified in areas with  
12 dense forest, buildings, or other features between the nighttime construction and the  
13 occupied roost site; where there is sufficient topographic relief to protect the roost site from  
14 excessive noise or visual disturbance; or where sound curtains are installed, as approved in  
15 writing by CDFW. Occupied roost sites that are within 300 feet of nighttime construction  
16 that occurs 30 minutes before sunset to 30 minutes after sunrise will be monitored daily  
17 (beginning 30 minutes before sunset) by the CDFW-approved biologist(s), for at least 4  
18 hours or until the roost site is no longer occupied, to verify that the activity is not disrupting  
19 the roosting birds. If the CDFW-approved biologist(s) determines construction are  
20 disrupting roosting activity, DWR will put additional protective measures in place until the  
21 tricolored blackbird behavior normalizes. Additional protective measures may include, but  
22 are not limited to, increasing the size of the no-activity buffer, delaying nighttime  
23 construction until the flock has left the roost site or the end of the nonbreeding season,  
24 temporarily relocating staging areas, temporarily rerouting access to the construction site,  
25 or installation of sound curtains. DWR will contact CDFW if protective measures are not  
26 effectively reducing disruption to the roost site.
- 27 6. Disturbance of Breeding Colonies and Roost Sites. DWR will prohibit physical contact with a  
28 breeding colony during the breeding season (March 15 through July 31) from the time of  
29 nest site selection until after the chicks have fledged. DWR will prohibit physical contact  
30 with an occupied roost site during the nonbreeding season (August 1 through March 14).  
31 Project personnel will not exit vehicles when inside the established no-activity buffer for  
32 breeding or roosting when tricolored blackbird is present.
- 33 7. Nesting Habitat Avoidance for Geotechnical Exploration and Transmission Line  
34 Construction. The CDFW-approved biologist (s) will delineate breeding colonies and buffers  
35 with flagging or other visible marking at construction sites for geotechnical exploration and  
36 transmission line construction, including work and staging areas and access roads. DWR will  
37 restrict these construction activities to construction sites outside of the delineated habitat.  
38 DWR will not conduct these construction activities within no-activity buffers established for  
39 breeding colonies.
- 40 8. Helicopters. DWR will not use helicopters to conduct field investigations or to string  
41 transmission lines within 200 horizontal feet (61 meters) or 150 vertical feet (46 meters) of  
42 breeding colonies unless the helicopter is small enough to only cause a down draft of 15 to  
43 18 miles per hour at up to 150 feet (46 meters). DWR will only operate helicopters at these  
44 distances from the breeding colony for up to 3 minutes in duration, once or twice per day,  
45 with a minimum of 4 hours between helicopter activities. For larger helicopters or longer  
46 work periods, DWR will consult with CDFW to establish the appropriate buffer. DWR will

1 ensure helicopters do not land or take off within 500 feet (152 meters) of any breeding  
2 colony. This buffer may be modified in areas with dense forest, buildings, or other features  
3 between the helicopter landing/take-off site and the breeding colony, where there is  
4 sufficient topographic relief to protect the breeding colony from excessive noise or  
5 disturbance; and as approved in writing by CDFW. Helicopters will not be used between 30  
6 minutes before sunset to 30 minutes after sunrise.

### 7 ***Mitigation Impacts***

8 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
9 mitigation measure impacts. The analyses below consider the potential impacts associated with  
10 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
11 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
12 *Measures*.

### 13 *Compensatory Mitigation*

14 The creation and enhancement of wetlands as well as habitat for special-status species under the  
15 project's CMP would affect tricolored blackbird through the permanent and temporary loss of  
16 habitat (Appendix 13C), from vegetation removal and grading to create the appropriate topography  
17 and soil conditions to establish or restore habitats.

18 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
19 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
20 vernal pool complexes, alkaline seasonal wetlands, or grasslands are located, and could result in the  
21 temporary disturbance of existing tricolored blackbird foraging habitat and the potential for  
22 disruption of normal behaviors, injury, or mortality of the species. Site-specific analyses are not  
23 provided because locations of potential non-bank sites are not currently known.

24 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
25 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
26 management of agricultural areas but may also include natural communities in the study area  
27 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
28 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
29 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
30 CMP-22b: *Tricolored Blackbird Foraging Habitat*). Conversion and management of agricultural lands  
31 would provide foraging habitat of equal or greater habitat value for tricolored blackbird and would  
32 maintain these lands in non-permanent crop types in perpetuity. Crop rotations, and related  
33 management activities would be conducted under a similar disturbance regime that the species  
34 would encounter under existing conditions, but could result in the disruption of normal behaviors,  
35 injury, or mortality. Grassland enhancement activities could also create temporary disturbances of  
36 the species. Site-specific analyses are not provided because locations of potential protection  
37 instruments are not currently known.

38 The CMP and site-specific permitting approvals would account for any losses of tricolored blackbird  
39 previously occupied colony habitat (occupied in the last 15 years) and occupied nesting habitat from  
40 habitat creation by adjusting the overall commitment of riparian creation (Appendix 3F, Section  
41 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-3, CMP-0: *General Design Guidelines*) and  
42 therefore reduce any habitat losses associated with the CMP to less than significant. The creation  
43 and enhancement activities would also have the potential for injury, mortality, and the disruption of

1 normal nesting and foraging behaviors of individuals if restoration activities occur during the  
2 breeding season (March 15 through July 31). Environmental Commitments EC-1: *Conduct Worker*  
3 *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
4 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-11: *Fugitive*  
5 *Dust Control*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix  
6 3B); and Mitigation Measure BIO-44: *Conduct Preconstruction Surveys and Implement Protective*  
7 *Measures to Avoid Disturbance of Tricolored Blackbird* would reduce the potential for injury,  
8 mortality, and the disruption of normal behaviors of individuals to less than significant. These  
9 impacts would be less than significant with mitigation because the aforementioned measures would  
10 (1) train construction staff on protecting tricolored blackbird, the requirements for avoiding  
11 impacts, and the ramifications for not following these measures; (2) minimize dust; (3) implement  
12 spill prevention and containment plans that would avoid material spills that could affect habitat; (4)  
13 prior to and during restoration and enhancement ground disturbance, establish protective buffers  
14 around occupied nesting habitat; and (5) have a biological monitor present that would ensure that  
15 non-disturbance buffers are intact and avoidance measures for tricolored blackbird and all  
16 protective measures are being implemented where applicable. Construction activities associated  
17 with the CMP would be expected to be conducted during the day, and would therefore not require  
18 additional lighting, or affect roosting tricolored blackbirds during the nonbreeding season (August 1  
19 through March 14) if roost sites are present.

20 Creation and enhancement of wetlands under the CMP have the potential to exacerbate  
21 bioaccumulation of methylmercury in tricolored blackbird by creating newly inundated wetlands  
22 which can produce the biogeochemical conditions to methylate mercury existing in Delta soils and  
23 expose songbirds to potentially high concentrations of methylmercury in large insect prey (Cristol et  
24 al. 2008:335). Potential effects of increased mercury exposure are unknown for tricolored blackbird  
25 but high concentrations of methylmercury have been reported in some songbirds. Because Bouldin  
26 Island and the I-5 ponds sites consist of existing managed and agricultural wetlands and ponds,  
27 wetland creation and enhancement are not expected to increase mercury methylation, relative to  
28 existing conditions. Monitoring and adaptive management plans as described in the CMP (Appendix  
29 3F, Section 3F.7.2) would include mercury monitoring and adaptive management at Bouldin Island  
30 and the I-5 ponds to prevent increased mercury methylation, relative to existing conditions.  
31 Mitigation Measure WQ-6: *Develop and Implement a Mercury Management and Monitoring Plan*,  
32 which contains measures to assess the amount of mercury at tidal restoration sites before project  
33 development, followed by appropriate design, monitoring, and adaptive management, would  
34 minimize the potential for any effects of increased methylmercury exposure. Therefore,  
35 implementation of the CMP would not be expected to have a significant adverse impact on tricolored  
36 blackbird.

37 Herbicides would be applied at CMP creation and enhancement sites to remove nonnative  
38 vegetation for site preparation and to support establishment of new plantings. Natural habitats  
39 contribute fewer pesticides to receiving waters than agricultural areas where pesticides are applied.  
40 Any newly created wetlands or enhanced natural habitat could also filter stormwater to remove  
41 solids and either improve or have no effect on pesticide concentrations in discharges to receiving  
42 waters, relative to existing conditions. As such, wetland creation and enhancement areas are  
43 expected to somewhat reduce, rather than increase, runoff of pesticides into adjacent waterbodies.  
44 Environmental Commitment EC-14: *Construction Best Management Practices for Biological Resources*  
45 (Appendix 3B) would ensure that herbicides would be applied in such a manner as to prevent  
46 primary or secondary poisoning of tricolored blackbirds.

1 Habitat creation and enhancement under the CMP has the potential to result in conditions that  
2 promote CHABs, which could result in impacts on tricolored blackbirds using created and/or  
3 enhanced wetland and aquatic habitats. High levels of microcystins in tissues and microcystin  
4 poisoning have been documented in other wetland bird species (Chen et al. 2009:3317) and could  
5 affect tricolored blackbirds if they forage in areas with conditions that promote CHABs. Monitoring  
6 and adaptive management plans as described in the CMP (Appendix 3F, Section 3F.7.2) would  
7 include CHAB monitoring and adaptive management at Bouldin Island and the I-5 ponds to prevent  
8 increased CHAB formation, relative to existing conditions. As discussed in Chapter 9, tidal habitat  
9 creation is not expected to cause substantial additional *Microcystis* production. Therefore,  
10 implementation of the CMP would not result in increased CHAB formation that could cause  
11 substantial adverse impacts on tricolored blackbird, relative to existing conditions.

12 Wetland creation and enhancement may provide habitat for tricolored blackbirds, which could  
13 increase the risk of selenium toxicity to the species. It is difficult to determine whether the effects of  
14 potential increases in selenium bioavailability associated with the CMP would lead to adverse  
15 effects. Potential effects of increased selenium exposure are likely low for tricolored blackbirds  
16 because they primarily forage on lower-trophic items with less potential to biomagnify selenium  
17 such as seeds and insects and often forage in non-wetland habitats, and existing selenium  
18 concentrations in the Sacramento River watershed are low (Central Valley Regional Water Quality  
19 Control Board 1988:14). Modeled concentrations in insect-eating bird eggs under existing  
20 conditions in the Delta were below levels of concern for other bird species (Appendix 9J). Therefore,  
21 potential very low-level increase in exposure to selenium resulting from wetland creation and  
22 enhancement would not be expected to adversely affect tricolored blackbird populations. The  
23 impact on tricolored blackbird from the project alternatives with the CMP would be less than  
24 significant with mitigation.

### 25 Other Mitigation Measures

26 Some mitigation measures would involve ground disturbance, the use of heavy equipment, pile  
27 driving, or pesticides that would have the potential to expose tricolored blackbird to excessive noise,  
28 visual disturbance, dust, and hazardous materials that could cause loss of modeled habitat,  
29 disruption of normal behaviors, and injury or mortality. The mitigation measures with potential to  
30 result in impacts on tricolored blackbird are similar to those discussed under Impact BIO-31:  
31 *Impacts of the Project on Western Yellow-Billed Cuckoo*. Impacts on tricolored blackbird resulting  
32 from implementation of mitigation measures would be similar to construction effects of the project  
33 alternatives in certain construction areas and would contribute to tricolored blackbird impacts of  
34 the project alternatives.

35 The impacts of habitat loss, noise, visual disturbance, and exposure to dust or hazardous materials  
36 on tricolored blackbird would be reduced through the CMP, environmental commitments, and  
37 Mitigation Measure NOI-1: *Develop and Implement a Noise Control Plan* as detailed under Impact  
38 BIO-31: *Impacts of the Project on Impacts of the Project on Western Yellow-Billed Cuckoo*. In addition,  
39 Mitigation Measure BIO-44: *Conduct Preconstruction Surveys and Implement Protective Measures to*  
40 *Avoid Disturbance of Tricolored Blackbird* would require species-specific measures to reduce these  
41 impacts. Therefore, impacts on tricolored blackbird from implementation of other mitigation  
42 measures would be reduced to less than significant.

1 Overall, the impacts on tricolored blackbird from construction of compensatory mitigation and  
 2 implementation of other mitigation measures, combined with project alternatives, would not change  
 3 the impact conclusion of less than significant with mitigation.

#### 4 **Impact BIO-45: Impacts of the Project on Bats**

5 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
 6 information on the species life histories and habitat suitability models for pallid bat, Townsend's  
 7 big-eared bat, big brown bat, silver-haired bat, western red bat, hoary bat, California myotis, little  
 8 brown bat, western small footed myotis, Yuma myotis, western pipistrelle, western mastiff bat, and  
 9 Mexican free-tailed bat are presented in the species accounts in Appendix 13B, *Species Accounts*,  
 10 Sections 13B.88 through 13B.100.

#### 11 **All Project Alternatives**

##### 12 Construction

13 The construction of all the project alternatives would result in permanent and temporary impacts on  
 14 modeled habitat for bats. The mechanisms for the loss of foraging and roosting habitat would  
 15 generally be similar for all project alternatives and would primarily occur as a result of the levee  
 16 improvement work, new roads and road improvements, the intake construction, and in addition for  
 17 Alternative 5 the Bethany Reservoir Pumping Plant and access roads (Appendix 13C). The central  
 18 alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would result in greater impacts on modeled  
 19 habitat compared to the eastern alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and the  
 20 Bethany Reservoir alignment alternative (Alternative 5) largely because of the levee improvements  
 21 on Bouldin Island and road improvements throughout the central alignment (Table 13-92).  
 22 Alternative 5 would result in substantially fewer impacts on modeled bat habitat, largely due to not  
 23 having the Southern Complex as part of this alternative. Environmental Commitment EC-14:  
 24 *Construction Best Management Practices for Biological Resources* would ensure that temporarily  
 25 disturbed areas are restored (Appendix 3B).

26 **Table 13-92. Impacts on Modeled Bat Habitat by Alternative**

Alternative	Permanent Impacts (foraging) (acres) <sup>a</sup>	Temporary Impacts (foraging) (acres)	Permanent Impacts (structure roosting) (acres) <sup>a</sup>	Temporary Impacts (structure roosting) (acres)	Permanent Impacts (tree roosting) (acres) <sup>a</sup>	Temporary Impacts (tree roosting) (acres)	Total (acres)
1	3,331.10	444.42	6.16	5.65	146.57	21.82	3,955.72
2a	3,623.05	498.69	5.94	6.08	194.90	29.97	4,358.63
2b	2,870.68	483.58	5.77	5.29	59.30	23.12	3,447.74
2c	3,143.89	496.85	5.94	5.85	143.34	24.04	3,819.91
3	3,016.67	393.54	8.28	5.78	108.58	18.14	3,550.99
4a	3,381.57	397.15	8.28	6.01	159.30	24.20	3,976.51
4b	2,573.11	382.03	8.11	5.23	23.71	17.35	3,009.54
4c	2,867.24	395.27	8.28	5.78	107.75	18.29	3,402.61
5	2,007.49	240.38	9.95	6.88	231.38	24.61	2,520.75

27 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 28 discussion in Section 13.3.1.2.

1 Construction activities associated with all facilities under all project alternatives have a potential for  
 2 injury, mortality, and the disruption of normal behaviors (i.e., foraging, roosting, breeding) of bats  
 3 from general construction disturbance (e.g., lights used for night work, vibrations, noise), the  
 4 removal of buildings, vegetation removal in advance of grading and excavation for the construction  
 5 of project infrastructure, bridge widening on the Hood-Franklin bridge over Snodgrass Slough  
 6 (Alternatives 1, 2a, 2c, 3, 4a, 4c, and 5), the widening of the SR 12 bridge over Little Potato Slough  
 7 (Alternatives 1, 2a, 2b, and 2c), and the widening of an overpass on SR 12 on Bouldin Island  
 8 (Alternatives 1, 2a, 2b, and 2c). Additional disturbance would take place with the removal of the  
 9 bridge over Connection Slough between Mandeville and Bacon Islands (Alternatives 1, 2a, 2b, and  
 10 2c), surface disturbance of the UPRR rail bridge over the California Aqueduct (Alternatives 1, 2a, 2b,  
 11 2c, 3, 4a, 4b, and 4c), and work on Lambert Road beneath the I-5 overpass (all alternatives). All of  
 12 these bridges and overpasses, except the overpass on Bouldin Island, were assessed for bats and bat  
 13 roosting habitat by DWR in 2009 (California Department of Water Resources 2011). Table 13-93  
 14 provides a summary of the structures, their potential to support bats, a listing of the relevant  
 15 alternatives, and proposed project activity. Environmental Commitments EC-1: *Conduct Worker*  
 16 *Awareness Training* and EC-14: *Construction Best Management Practices for Biological Resources*  
 17 (Appendix 3B) would ensure that construction staff are trained on protecting bat colonies, reporting  
 18 requirements, and the ramifications for not following these measures and would reduce these  
 19 potential impacts by having a qualified biological monitor present and implementing non-  
 20 disturbance buffers using construction fencing, where applicable.

21 **Table 13-93. Structures Evaluated for Bat Habitat in the Project Footprint <sup>a</sup>**

Structure Type	Location	Summary of Findings	Alternatives	Project Activity
Bridge	Hood-Franklin Road at Snodgrass Slough	No sign of bats, potential night-roosting habitat	1, 2a, 2c, 3, 4a, 4c, 5	Bridge widening
Bridge	UPRR Railroad at California Aqueduct	Potential day and night roosting	1, 2a, 2b, 2c, 3, 4a, 4b, 4c	New tracks on existing bridge
Overpass	I-5 at Lambert Road	No sign of bats, potential night roost habitat	All	Resurfacing of road
Bridge	SR 12 at Little Potato Slough	No sign of bats (not all areas accessible), potential roosting habitat assumed	1, 2a, 2b, 2c	Bridge widening
Overpass	SR 12 at farm road on Bouldin Island	Not assessed	1, 2a, 2b, 2c	Overpass widening
Bridge	Un-named road at Connection Slough connecting Mandeville and Bacon Islands	No habitat (metal structure with no potential habitat)	1, 2a, 2b, 2c	Temporary work area for removing the bridge

22 I- = Interstate; SR = State Route.

23 <sup>a</sup> Evaluation conducted by DWR staff in 2009 (California Department of Water Resources 2011).

24

25 There are no CNDDDB occurrences of bats that would be permanently or temporarily affected by  
 26 project construction for any of the project alternatives (California Department of Fish and Wildlife  
 27 2020a); however, that does not mean bats are not currently occupying these areas because surveys  
 28 have not been conducted in all parts of the study area. The nearest bat occurrence is a western red

1 bat record (#68, from 1999) approximately 4 miles west of a tunnel shaft work area between  
2 Walnut Grove and Thornton (California Department of Fish and Wildlife 2020a).

3 Field investigations for all project alternatives would be conducted prior to and during construction  
4 to more specifically identify appropriate construction methods and design criteria addressed in the  
5 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
6 and address the establishment of geological and groundwater monitoring programs (Delta  
7 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
8 variety of ground-disturbing activities that would vary in duration from several hours to  
9 approximately 6 weeks (Section 3.15, *Field Investigations*; Delta Conveyance Design and  
10 Construction Authority 2022a, 2022b) and could result in impacts on habitat, the potential for  
11 injury, mortality, and the disruption of normal behaviors of bats. Geotechnical investigations  
12 associated with the tunnels for all alternatives, which include CPTs and soil borings, would result in  
13 temporary impacts on modeled habitat (Appendix 13C). The West Tracy Fault Study investigations  
14 would temporarily disturb modeled foraging habitat but not roosting habitat for bats. The Bethany  
15 Fault Study geotechnical investigations (Alternative 5) would be completed in a single day and  
16 would involve placing approximately 20 ERT probes 0.5 inch in diameter. The study would be  
17 conducted entirely on foot, perpendicular to the tunneled portion of the Bethany Reservoir  
18 Aqueduct (Delta Conveyance Design and Construction Authority 2022a, 2022b). The Bethany Fault  
19 Study could result in minor disruption of normal behaviors, but because of its small footprint and  
20 the short (1-day) duration of the disturbance, impacts on modeled foraging habitat are not  
21 quantified and are considered negligible. The following field investigations would be conducted  
22 within proposed surface construction footprints of project facilities (including portions of tunnel  
23 alignments) and would temporarily affect habitat: test trenches, CPTs, soil borings, ERT,  
24 groundwater testing and monitoring, monument installation, pile installation test methods at the  
25 north Delta intakes, pilot studies for settlement, agronomic testing, and utility potholing. These  
26 temporary impacts are not characterized as an additional loss of habitat because impacts for these  
27 locations have already been quantified within the construction footprints but could still result in the  
28 potential for injury, mortality, and the disruption of normal behaviors of bats as discussed above for  
29 conveyance facility construction. Environmental Commitments EC-1: *Conduct Worker Awareness*  
30 *Training* and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B)  
31 would ensure that construction staff are trained on protecting bat colonies, reporting requirements,  
32 and the ramifications for not following these measures and reduce these potential impacts by having  
33 a qualified biological monitor present to ensure that non-disturbance buffers and associated  
34 construction fencing are intact and all other protective measures are being implemented, where  
35 applicable.

### 36 Operations

37 Lighting at project facilities has the potential to affect bats if roosting habitat is close to the light  
38 source or if light is directed toward roosting habitat, which could make the roost unusable or  
39 disrupt normal behaviors of bats using the roost.

40 It is unclear whether lighting affects bat foraging behavior because their prey (insects) respond very  
41 differently to different types of lighting and thus bat attraction also varies (Johnston et al. 2019:3-2,  
42 3-3).

43 As stated in Chapter 3, Section 3.4.12, *Fencing and Lighting*, permanent lighting at project facilities  
44 would be motion activated, downcast, cut-off type fixtures with non-glare finishes, which would

1 avoid the potential for this impact. The analysis in Chapter 18, Impact AES-4: *Create New Sources of*  
2 *Substantial Light That Would Adversely Affect Day or Nighttime Views of the Construction Areas or*  
3 *Permanent Facilities*, shows that with the project designs the lighting would be shielded and  
4 oriented in such a manner so as not to subject the immediate surroundings to extremes in levels of  
5 light; however, some impact on bats may remain.

### 6 Maintenance

7 The maintenance of aboveground water conveyance facilities for all project alternatives  
8 infrastructure could result in impacts on bats. Maintenance activities across all facilities that could  
9 affect bats include repaving of access roads every 15 years, semiannual general and ground  
10 maintenance (e.g., mowing, vegetation trimming, herbicide application), and daily or weekly  
11 inspections by vehicle, could result in disturbances to roosting bats, if present.

### 12 **CEQA Conclusion—All Project Alternatives**

13 Construction, operation, and maintenance of all project alternatives would result in impacts on bats  
14 through the permanent and temporary loss of modeled habitat and the potential for injury,  
15 mortality, and the disruption of normal behaviors. The temporary loss of habitat and the potential  
16 impacts of injury, mortality, and the disruption of normal behaviors of bats from project  
17 construction would be reduced by Environmental Commitments EC-1: *Conduct Worker Awareness*  
18 *Training* and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B);  
19 however, even with these commitments, the loss of habitat from the construction of the project  
20 alternatives and the potential for injury, mortality, and disruption of normal behaviors from  
21 construction, operations, and maintenance on bats would be significant. The CMP would offset the  
22 loss of tree-roosting habitat by creating and protecting riparian habitat (Appendix 3F, Section  
23 3F.3.2.3) and offset the loss of foraging habitat by creating and protecting wetlands, riparian, and  
24 grasslands on Bouldin Island and at the I-5 ponds (Appendix 3F, Sections 3F.3.2 and 3F.3.3) and  
25 through the protection of agricultural foraging habitat for sandhill cranes, Swainson's hawk, and  
26 tricolored blackbird (Appendix 3F, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
27 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
28 CMP-19b: *Swainson's Hawk Foraging Habitat*, and CMP-22a: *Tricolored Blackbird Nesting Habitat*,  
29 and CMP-22b: *Tricolored Blackbird Foraging Habitat*). Any losses of roosting habitat on bridges and  
30 overpasses would be mitigated by Mitigation Measure BIO-45a: *Compensate for Impacts on Bat*  
31 *Roosting Habitat on Bridges and Overpasses*. The CMP together with Mitigation Measure BIO-45a  
32 would reduce the loss of bat habitat to a less-than-significant level. Mitigation Measures AES-4b:  
33 *Minimize Fugitive Light from Portable Sources Used for Construction* (Chapter 18), BIO-2b: *Avoid and*  
34 *Minimize Impacts on Terrestrial Biological Resources from Maintenance Activities*, and BIO-45b: *Avoid*  
35 *and Minimize Impacts on Bats* would be required to avoid and minimize the potential for injury,  
36 mortality, disruption of normal behaviors, and disturbances to habitat. The impacts on bats from the  
37 project alternatives would be less than significant with mitigation because these measures would  
38 replace lost habitat and reduce direct effects on the species (including habitat modification) by (1)  
39 implementing protective measures during maintenance activities, which would include assessing  
40 work areas for habitat and conducting surveys for bats where appropriate and delaying  
41 maintenance activities where possible; (2) designing lighting that avoids spillover into habitats and  
42 choosing light sources less disruptive to wildlife and thus avoiding disrupting roost sites and  
43 foraging activity; and (3) prior to and during construction, identifying occupied roosts and



1 implementing construction activities such that the avoid disrupting roosts, in particular maternal  
2 roosts, and establishing protective buffers around roosts.

### 3 **Mitigation Measure CMP: Compensatory Mitigation Plan**

4 DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to  
5 offset the loss of bat tree-roosting habitat by creating and protecting riparian habitat on Bouldin  
6 Island and at the I-5 ponds, and managing these areas in perpetuity (Appendix 3F, Section  
7 3F.3.2.3). Bat foraging habitat losses would be offset by creating and protecting wetlands,  
8 riparian, and grasslands on Bouldin Island and at the I-5 ponds (Appendix 3F, Sections 3F.3.2  
9 and 3F.3.3) and through the protection and management of agricultural foraging habitat for  
10 sandhill cranes, Swainson's hawk, and tricolored blackbird, which would also generally benefit  
11 foraging bats, in particular on lands managed for tricolored blackbird, which have limitations on  
12 insecticide use (Appendix 3F, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
13 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
14 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*,  
15 and CMP-22b: *Tricolored Blackbird Foraging Habitat*). Channel margin restoration would  
16 include riparian plantings on rock benches (Appendix 3F, Section 3F.4.3.3.3) that may provide  
17 for future tree-roosting bat habitat once trees mature.

### 18 **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for** 19 **Construction**

20 See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

### 21 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 22 **Resources from Maintenance Activities**

23 See description of Mitigation Measure BIO-2b under Impact BIO-2.

### 24 **Mitigation Measure BIO-45a: Compensate for the Loss of Bat Roosting Habitat on Bridges** 25 **and Overpasses**

#### 26 ***All Project Alternatives***

27 If bridge or overpass roosting habitat is lost during bridge or overpass widening, DWR will  
28 replace habitat on the same bridge or overpass at a minimum ratio of 1:1 or a functionally  
29 equivalent amount of habitat. To the extent practicable, replacement habitat will have similar  
30 dimensions and orientation as the habitat that was affected or lost. Replacement habitat on  
31 bridges/overpasses and associated monitoring will follow the guidance in *Caltrans Bat*  
32 *Mitigation: A Guide to Developing Feasible and Effective Solutions* (Johnston et al. 2019), or the  
33 most recent guidance available at that time, with final plans developed in coordination with  
34 CDFW.

### 35 **Mitigation Measure BIO-45b: Avoid and Minimize Impacts on Roosting Bats**

#### 36 ***All Project Alternatives***

37 The following measures were designed to avoid and minimize impacts on special-status bats.  
38 These measures are in part adopted from *Caltrans Bat Mitigation: A Guide to Developing Feasible*

1 *and Effective Solutions* (Johnston et al. 2019). Bat species with potential to occur in the study  
2 area employ varied roost strategies, from solitary roosting in foliage of trees to colonial roosting  
3 in trees and artificial structures, such as buildings and bridges. Daily and seasonal variations in  
4 habitat use are common. To obtain the highest likelihood of detection, preconstruction bat  
5 surveys will be implemented by DWR approximately 2 years prior to the beginning of  
6 construction at a given location, to the extent practicable.

### 7 *Preconstruction Bridge, Overpass, and Other Structure Surveys*

- 8 1. Approximately 2 years prior to construction, including demolition, beginning on a bridge,  
9 overpass or a structure, a qualified biologist, with knowledge of the natural history of  
10 California bats, experience identifying habitat, and experience using full-spectrum acoustic  
11 equipment, will conduct a daytime search for bat sign (e.g., guano, urine staining, culled  
12 insect parts) on or underneath the bridge, overpass, or structure. This 2-year period prior to  
13 construction allows enough time to conduct surveys and plan for evictions, if necessary.  
14 Biologists conducting daytime surveys will listen for audible social calls through the use of  
15 bat detector, which converts ultrasonic echolocation emissions into frequencies audible to  
16 humans in real-time. This field assessment can be performed during any time of year,  
17 provided that weather conditions or local flooding do not affect the biologist's ability to do a  
18 thorough evaluation. Visual observations can be made using the naked eye, binoculars, a  
19 high-powered flashlight, and or a fiber-optic camera probe to inspect eaves and attics of  
20 structures and on bridge or overpass expansion joints, weep holes, and other bridge or  
21 overpass features that could house bats. Surveys should include the following methods.
  - 22 a. Survey under the entire bridge or overpass, as practicable.
  - 23 b. Identify the type of habitat present (e.g., day and night-roosting habitat).
  - 24 c. Describe the features that provide the roosting habitat (e.g., expansion joints, hinges,  
25 closure pours).
  - 26 d. Describe signs of bat use with respect to each habitat feature, if present.
  - 27 e. Include a sketch of the structure showing the locations of suitable habitat features and  
28 bat activity in each feature, based on sign or visual detection. A sketch will help in  
29 describing the habitat feature and planning for future surveys.
  - 30 f. Use the preferred method of documenting conditions in the survey area, including  
31 evidence of bats: a digital camera capable of capturing high-resolution images that  
32 provide scale. Take adequate photos to capture the bridge or overpass size, structural  
33 type, and all features that are relevant to bat use. At a minimum, the photographs should  
34 document the bridge or overpass signage (with identification number, post mile, and  
35 bridge or overpass name [if applicable]); a right-angle (i.e., side perspective) view  
36 showing the entire span; the abutments and any details associated with potential  
37 roosting habitat; representative images of the soffit, expansion joints, hinges, and  
38 closure pours; how the piers support the deck; representative weep holes documenting  
39 the presence or absence of screens; and images of various bat sign, such as urine  
40 staining and guano on the structure.
  - 41 g. Because several species may occupy a bridge or overpass, ensure that each type of  
42 guano sign is photographed. If bats occupy the bridge or overpass, the survey time  
43 under active roosts needs to be limited. Any use of flash photography to document

- 1 roosting bats will create some level of disturbance. Many digital cameras can take  
2 images at very low light; if a flash is required, use a minimum setting such as 1/8 power  
3 or less.
- 4 h. Estimate dimensions (i.e., length, width, depth) of each roost habitat type. Dimensions  
5 should be taken into consideration when designing mitigation habitat.
- 6 i. Describe surrounding environmental conditions, including the dominant habitat type  
7 present, aquatic features, and other potential roost habitat (e.g., tree snags or large  
8 sycamores with cavities) on-site and in its vicinity. Survey the entire project site plus a  
9 100-foot-wide buffer for potential roosting habitat.
- 10 2. If no habitat or sign of bats is observed, no further surveys are warranted. The biologist will  
11 carefully document the reasons for determining that no bat habitat is present on the bridge,  
12 overpass, or structure, and why further surveys are not merited. If habitat is present, but no  
13 sign of bats is observed, additional surveys would be necessary to support the conclusion  
14 that bats are not present because small colonies and individuals may often not produce  
15 obvious signs of occupancy and depending on the timing of the habitat assessment bats may  
16 have migrated or are not occupying the habitat at that time.
- 17 3. If suitable habitat or signs of bat use are observed during the preliminary field assessment,  
18 focused surveys should be performed by a biologist to determine whether colonies are  
19 present and the approximate size of the colony or colonies and the species present. Caution  
20 should be taken when conducting field surveys at active roosts. To ensure that disturbance  
21 is kept to a minimum, the biologist and any field assistants should not loiter directly  
22 underneath known or suspected occupied roosts longer than is necessary to record data.  
23 Surveys should be performed in the summer, fall, spring, and winter to determine how the  
24 site is used by bats. Information collected during focused surveys should include an estimate  
25 of the number of bats and species present during the summer, fall or spring, and winter to  
26 provide an assessment of spatial and temporal use, as described below.
- 27 a. Maternity season surveys. In California, the maternity season generally occurs from  
28 March 1 to August 31. The exact timing of the maternity season surveys will be  
29 determined by the biologist and take into consideration conditions in a given year. The  
30 following methods will be used for maternity season surveys.
- 31 i. Conduct a daytime inspection to determine if bats are present and to identify  
32 areas of high use. While daytime inspections are usually sufficient to determine  
33 the presence of night-roosting habitat, nighttime roost inspections (2 to 3 hours  
34 after sunset) are recommended if special-status species are suspected to occur.
- 35 ii. Conduct a follow-up dusk emergence count survey. Dusk emergence count  
36 surveys should be conducted on a warm night when nighttime lows are not less  
37 than 45°F and during dry weather conditions. Surveys should be conducted from  
38 approximately 15 minutes before sunset to 1 hour after sunset. Prior to any dusk  
39 emergence count, the biologist should understand the primary locations where  
40 bats are day roosting so these locations can be targeted during the emergence  
41 count. Depending on the locations and number of roost exit points, multiple  
42 surveyors may be needed. Surveyors should each be assigned a specific area that  
43 does not overlap with other surveyors' locations. Surveyors should station

- 1 themselves such that roost exit points are backlit by the sky. If possible, night-  
2 vision goggles should be used to assist in the counting.
- 3 iii. Use bat detectors that produce an audible sound, which is helpful in identifying  
4 and counting bats as they emerge from the roost. Conduct active acoustic  
5 monitoring concurrent with exit count surveys to determine species or frequency  
6 group of bats.
- 7 b. Fall and spring migratory period surveys. At least one daytime site inspection and one  
8 dusk emergence count should be conducted between March and April, and between  
9 early September and mid-October, to assess if bats are present and to count individuals.
- 10 c. Winter surveys. At least one daytime site inspection should be conducted in January or  
11 February to determine if winter hibernacula or overwintering habitat for bats are  
12 present. Crevice-roosting species typically roost deep in crevices in the winter, and they  
13 may not be visible during winter inspections. Therefore, visual surveys, in combination  
14 with the use of an extendable fiber-optic camera probe to view inside crevices may be  
15 required for some bridges, overpasses, or structures.

#### 16 Preconstruction Tree Surveys

- 17 4. If tree removal or trimming is necessary for project construction, approximately 1 year prior  
18 to construction at a given location a biologist will examine trees to be removed or trimmed  
19 for suitable bat roosting habitat. High-value habitat features (e.g., large tree cavities, basal  
20 hollows, loose or peeling bark, larger snags, palm trees with intact thatch) will be identified  
21 and the area around these features searched for bats and bat sign (e.g., guano, culled insect  
22 parts, staining). Riparian woodland, orchards, and stands of mature broadleaf trees should  
23 be considered potential habitat for solitary foliage-roosting bat species.
- 24 5. If bat sign is detected, biologists will conduct evening visual emergence survey of the source  
25 habitat feature, from a half hour before sunset to 1 to 2 hours after sunset for a minimum of  
26 2 nights within the season that construction would be taking place. Methodology should  
27 follow that described above for the bridge or overpass emergence survey.
- 28 6. Additionally, if suitable tree-roosting habitat is present, acoustic monitoring with a bat  
29 detector will be used to assist in determining species present. These surveys will be  
30 conducted in coordination with the acoustic monitoring conducted for the bridge, overpass,  
31 or structure.

#### 32 Protective Measures for Bats Using Bridges, Overpasses, Structures, and Trees

- 33 7. Avoidance and minimization measures will be necessary if it is determined that bats are  
34 using a bridge, overpass, or structure or trees as roost sites and/or sensitive bats species are  
35 detected during acoustic monitoring. Appropriate measures will be determined by DWR in  
36 consultation with CDFW and will include, as applicable, the following measures.
- 37 a. Ensure that bats are protected from noise, vibrations, and light that result from  
38 construction activities associated with project infrastructure as well as operations and  
39 maintenance of aboveground water conveyance facilities. This would be accomplished  
40 by either directing noise barriers and lights inward from the disturbance or ensuring  
41 that the disturbances do not extend more than 300 feet from the point source.

- 1           b. Avoid disturbance of the bridge, overpass, or structure between March 1 and August 31  
2           (the maternity period) to avoid impacts on reproductively active females and dependent  
3           young.
- 4           c. Installation of exclusion devices from March 1 through October 31 to preclude bats from  
5           occupying the bridge or overpass during construction. Exclusionary devices will only be  
6           installed by or under the supervision of an experienced biologist.
- 7           d. Avoid tree removal between April 15 and September 15 (the maternity period for bat  
8           species that use trees) to avoid impacts on pregnant females and active maternity roosts  
9           (whether colonial or solitary).
- 10          e. Conduct tree removal between September 15 and October 31 to the maximum extent  
11          practicable, which corresponds to a time period when bats would not likely have  
12          entered winter hibernation and would not be caring for flightless young. If weather  
13          conditions remain conducive to regular bat activity beyond October 31, later tree  
14          removal may be considered in consultation with CDFW.
- 15          f. Remove trees in pieces, rather than felling the entire tree.
- 16          g. If a maternity roost is located, whether solitary or colonial, leave that roost undisturbed  
17          with a buffer as determined in consultation with CDFW until September 15 or until a  
18          biologist has determined the roost is no longer active.
- 19          h. If a non-maternity roost is found, avoid that roost to the maximum extent practicable  
20          and use an appropriate buffer established in consultation with CDFW. Every effort will  
21          be made to avoid the roost to the maximum extent practicable, as methods to evict bats  
22          from trees are largely untested. However, if the roost cannot be avoided, eviction will be  
23          attempted and procedures designed in consultation with CDFW to reduce the likelihood  
24          of mortality of evicted bats. In all cases:
- 25            i. Eviction will not occur before September 15 and will match the timeframe for tree  
26            removal approved by CDFW.
- 27            ii. Biologists will carry out or oversee the eviction tasks and monitor the tree  
28            trimming or removal.
- 29            iii. Eviction will take place late in the day or in the evening to reduce the likelihood of  
30            evicted bats falling prey to diurnal predators.
- 31            iv. Eviction will take place during weather and temperature conditions conducive to  
32            bat activity.
- 33            v. Special-status bat roosts will not be disturbed.
- 34            vi. Evictions will not occur until temporary or permanent replacement roosting  
35            habitat is established in close proximity to the roost. Replacement habitat plans  
36            will be reviewed and approved by CDFW. Habitat will be replaced at a ratio of 1:1  
37            and will be functionally equivalent.
- 38          8. Eviction procedures will include but are not limited to:
- 39            a. Pre-eviction surveys to obtain data to inform the eviction approach and subsequent  
40            mitigation requirements. Relevant data may include the species, sex, reproductive  
41            status, and number of bats using the roost, and roost conditions such as temperature

- 1 and dimensions. Surveys may include visual emergence, night vision, acoustic, and  
2 capture.
- 3 b. Structural changes may be made to the roost, performed without harming bats, such  
4 that the conditions in the roost are undesirable to roosting bats and the bats leave on  
5 their own (e.g., open additional portals so that temperature, wind, light, and  
6 precipitation regime in the roost change).
- 7 c. Uninjurious harassment at the roost site to encourage bats to leave on their own, such  
8 as ultrasound deterrents or other sensory irritants.

## 9 ***Mitigation Impacts***

10 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
11 mitigation measure impacts. The analyses below consider the potential impacts associated with  
12 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
13 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
14 *Measures*.

### 15 *Compensatory Mitigation*

16 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
17 species on Bouldin Island and at the I-5 ponds under the project's CMP would affect modeled  
18 roosting and foraging habitat for bats (Appendix 13C) from vegetation removal and grading to  
19 create the appropriate topography and soil conditions to establish/restore habitats. The CMP could  
20 also affect modeled riparian habitat for bats through tidal wetland habitat restoration and channel  
21 margin enhancement because potential areas identified generally overlap with modeled bat habitat  
22 (Appendix 3F, Section 3F.4.3.4.2, *Site Selection Criteria and Tools*).

23 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
24 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
25 vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located, which could  
26 be used for bat foraging but these activities would not likely result in effects on bats because the  
27 work would be during the daytime, not take place in areas of roosting habitat, and the habitat  
28 disturbance would be minimal. Site-specific analyses are not provided because locations of potential  
29 non-bank sites are not currently known.

30 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
31 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
32 management of agricultural areas but may also include natural communities in the study area  
33 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
34 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
35 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
36 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could potentially contain roosting and  
37 foraging habitat for bats and management activities could affect this habitat and result in the  
38 disruption of normal behaviors, injury, and mortality of bats. Site-specific analyses are not provided  
39 because locations of potential protection instruments are not currently known.

40 The CMP and site-specific permitting approvals would ensure no significant loss in habitat or habitat  
41 value (Appendix 3F, Section 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General*  
42 *Design Guidelines*) and therefore reduce any habitat losses associated with the CMP to less than

1 significant. The creation and enhancement activities would also have the potential to cause injury,  
2 mortality, and the disruption of normal behaviors of bats. Environmental Commitments EC-1:  
3 *Conduct Worker Awareness Training* and EC-14: *Construction Best Management Practices for*  
4 *Biological Resources* (Appendix 3B), and Mitigation Measure BIO-45b: *Avoid and Minimize Impacts*  
5 *on Bats* would reduce the potential for injury, mortality, and the disruption of normal behaviors of  
6 individuals to less than significant. These impacts would be less than significant with mitigation  
7 because the aforementioned measures would (1) train construction staff on protecting bats, the  
8 requirements for avoiding impacts, and the ramifications for not following these measures, and (2)  
9 prior to and during restoration and enhancement ground disturbance, identify occupied tree roosts  
10 and implement activities such that they avoid disrupting roosts, in particular maternal roosts, and  
11 establish protective buffers around roost sites.

12 The impact on special-status bats from the project with the CMP would be less than significant with  
13 mitigation.

#### 14 Other Mitigation Measures

15 Some mitigation measures would involve ground disturbance, building removal, vegetation removal,  
16 and the use of heavy equipment that would have the potential to result in loss of modeled habitat or  
17 result in injury, mortality, and the disruption of normal behaviors from exposure to excessive  
18 lighting, vibrations, and noise. Impacts on bats resulting from implementation of mitigation  
19 measures would be similar to construction effects of the project alternatives in certain construction  
20 areas and would contribute to impacts of the project alternatives on bats.

21 The loss of habitat and potential impacts of injury, mortality, and the disruption of normal behaviors  
22 of bats from the implementation of mitigation measures would be reduced through the CMP;  
23 Environmental Commitments EC-1: *Conduct Worker Awareness Training*, and EC-14: *Construction*  
24 *Best Management Practices for Biological Resources*; Mitigation Measure AES-4b: *Minimize Fugitive*  
25 *Light from Portable Sources Used for Construction*, and Mitigation Measure BIO-45b: *Avoid and*  
26 *Minimize Impacts on Roosting Bats*. Therefore, impacts on bats from implementation of other  
27 mitigation measures would be reduced to less than significant.

28 Overall, the impacts on bats from construction of compensatory mitigation and implementation of  
29 other mitigation measures, combined with project alternatives, would not change the impact  
30 conclusion of less than significant with mitigation.

#### 31 **Impact BIO-46: Impacts of the Project on San Joaquin Kit Fox**

32 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
33 information on the species life history and habitat suitability model for San Joaquin kit fox are  
34 presented in the species account in Appendix 13B, Section 13B.101, *San Joaquin Kit Fox*.

35 Although habitat was modeled and the species is being considered for potential impacts, recent data  
36 shows an absence of San Joaquin kit fox from the northern portion of the range, including extensive  
37 surveys using scent dogs in 2001–2003 in Contra Costa and Alameda Counties that did not detect  
38 any sign of kit fox (U.S. Fish and Wildlife Service 2020a:27). Surveys and monitoring conducted in  
39 2009–2017, and in 2021 to the east and west of Bethany Reservoir, which included den surveys and  
40 trail camera use, did not detect San Joaquin kit fox in these areas (California Department of Water  
41 Resources 2021:2; Environmental Science Associates 2017:4-23). USFWS, in their 2020 status  
42 assessment for the species, concluded that the Livermore analysis unit, which includes the

1 westernmost portion of the study area, is in a “very low condition” for San Joaquin kit fox and shows  
2 “no evidence of a current population” (U.S. Fish and Wildlife Service 2020a:50–54).

### 3 **All Project Alternatives**

#### 4 Construction

5 The construction of Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c would not result in impacts on  
6 modeled habitat. The nearest project infrastructure is the SCADA line that connects the South Delta  
7 Outlet and Control Structure to the facilities at the Banks Pumping Plant, which passes adjacent to  
8 modeled kit fox habitat but would be buried in the existing access road running along the California  
9 Aqueduct.

10 Construction of the SCADA line from the South Delta Outlet and Control Structure to the Banks  
11 Pumping Plant for Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c could result in the injury, mortality, and  
12 disruption of normal behaviors (e.g., foraging, dispersal) of San Joaquin kit fox if they are active in  
13 areas adjacent to this work area during construction. These effects could result from trenching and  
14 the use of construction-related vehicles. Environmental Commitments EC-1: *Conduct Worker*  
15 *Awareness Training* and EC-14: *Construction Best Management Practices for Biological Resources*  
16 (Appendix 3B) would reduce the potential for injury and mortality by (1) training construction staff  
17 on protecting San Joaquin kit fox, reporting requirements, and the ramifications for not following  
18 these measures; (2) having a biological monitor present to ensure that non-disturbance buffers and  
19 associated construction fencing are intact and all other protective measures are being implemented;  
20 (3) ensuring trenches are covered at the end of the day or escape ramps are installed; (4) limiting  
21 construction vehicle traffic to a maximum speed limit of 15 miles per hour on unpaved, non-public  
22 construction access roads and nighttime speed limits to 10 miles per hour on these roads when they  
23 occur adjacent to suitable habitat for San Joaquin kit fox; (5) properly disposing of trash; and (6)  
24 keeping the work area free of firearms and pets.

25 The construction of Alternative 5 would result in the permanent and temporary loss of San Joaquin  
26 kit fox modeled habitat as a result of grading and excavation (Table 13-94). These impacts would  
27 occur as a result of the construction of the Bethany Reservoir Aqueduct (permanent and temporary  
28 impacts on low-quality modeled habitat), construction of the Bethany Reservoir Discharge Structure  
29 and associated access road (permanent and temporary impacts on low-quality modeled habitat),  
30 and construction of a metering area near Bethany Reservoir (permanent and temporary impacts on  
31 high-quality habitat). Environmental Commitment EC-14: *Construction Best Management Practices*  
32 *for Biological Resources* would ensure that temporarily disturbed areas are restored (Appendix 3B).

33 **Table 13-94. Impacts on San Joaquin Kit Fox Habitat by Alternative**

Alternative	Permanent Impacts High Quality (acres) <sup>a</sup>	Permanent Impacts Moderate Quality (acres) <sup>a</sup>	Permanent Impacts Low Quality (acres) <sup>a</sup>	Temporary Impacts High Quality (acres)	Temporary Impacts Moderate Quality (acres)	Temporary Impacts Low Quality (acres)	Total (acres)
1, 2a, 2b, 2c, 3, 4a, 4b, 4c	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	38.26	0.04	0.02	16.31	54.61

34 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
35 discussion in Section 13.3.1.2.



1 Construction of the Bethany Reservoir Aqueduct, the Bethany Reservoir Discharge Structure, and  
2 access roads could result in the injury, mortality, and disruption of normal behaviors of San Joaquin  
3 kit fox if they are active in these areas during construction. These effects could result from project  
4 grading, excavation, the use of construction-related vehicles, and exposure of San Joaquin kit fox to  
5 construction-related fluids, such as fuels, oils, and cement. Environmental Commitments EC-1:  
6 *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management*  
7 *Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and  
8 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would  
9 reduce the potential for injury and mortality by (1) training construction staff on protecting San  
10 Joaquin kit fox, reporting requirements, and the ramifications for not following these measures; (2)  
11 having a biological monitor present to ensure that non-disturbance buffers and associated  
12 construction fencing are intact and all other protective measures are being implemented; (3)  
13 ensuring trenches are covered at the end of the day or escape ramps are installed; (4) limiting  
14 construction vehicle traffic to a maximum speed limit of 15 miles per hour; (5) properly disposing of  
15 trash; (6) reducing the potential for discharge of construction materials in areas of potential habitat;  
16 and (7) keeping the work area free of firearms and pets.

17 Three historic CNDDDB occurrences for San Joaquin kit fox overlap with the project footprint for  
18 Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c (California Department of Fish and Wildlife 2020a).  
19 Occurrence #1,033 overlaps with the Southern Forebay, new permanent roads, and the temporary  
20 railway. This occurrence states that an observation was made sometime between 1972 and 1975  
21 west of Clifton Court Forebay and 1.5 miles east of Byron Hot Springs. The area where this record is  
22 mapped is agricultural (i.e., hay, pasture, and alfalfa). CNDDDB occurrence #61 overlaps with new  
23 road construction west of Byron Highway. This occurrence also lacks a specific location and is  
24 defined as being in the vicinity of Byron Airport, approximately 2 miles south of Byron (California  
25 Department of Fish and Wildlife 2020a). The occurrence is a mix of roadkill and sightings between  
26 1972 and 1975, and an unknown number observed between 1990 and 1993 (California Department  
27 of Fish and Wildlife 2020a). This occurrence consists of a large polygon that covers areas of  
28 agriculture (hay and pasture), grassland, and developed areas. CNDDDB occurrence # 561 overlaps  
29 with the SCADA line connecting the South Delta Outlet and Control Structure to the Banks Pumping  
30 Plant. This occurrence lacks a specific location and is defined as being near the Alameda/Contra  
31 Costa County Line and the California Aqueduct (California Department of Fish and Wildlife 2020a).  
32 The occurrence is a mix of sightings between 1972 and 1975 and an adult observed in  
33 1987(California Department of Fish and Wildlife 2020a). The polygon for this occurrence overlaps  
34 with developed areas, grassland, alkali seasonal wetland, and vernal pool complex, with only a small  
35 portion overlapping modeled low-quality habitat.

36 One historic CNDDDB occurrence (#44) for San Joaquin kit fox overlaps with the road improvements  
37 on Mountain House Road under Alternative 5 (California Department of Fish and Wildlife 2020a).  
38 This occurrence is from 1992, just east of the intersection of Mountain House Road and the Delta-  
39 Mendota Canal, is described as an adult foraging (California Department of Fish and Wildlife 2020a).  
40 The occurrence overlaps with modeled low-quality habitat and a wheat field.

41 Field investigations for Alternative 5 would be conducted prior to and during construction to more  
42 specifically identify appropriate construction methods and design criteria addressed in the final  
43 design documents, verify soil rehabilitation methods, confirm the locations of existing utilities, and  
44 address the establishment of geological and groundwater monitoring programs (Delta Conveyance  
45 Design and Construction Authority 2022a, 2022b). Field investigations would involve a variety of  
46 ground-disturbing activities that would vary in duration from several hours to approximately 6

1 weeks (Section 3.15; Delta Conveyance Design and Construction Authority 2022a, 2022b) and could  
2 result in impacts on habitat, the potential for injury, mortality, and the disruption of normal  
3 behaviors of San Joaquin kit fox. Geotechnical investigations associated with the tunnel for the  
4 Bethany Reservoir Aqueduct (Alternative 5), which include CPTs and soil borings, would result in  
5 temporary impacts on habitat (Appendix 13C). The Bethany Fault Study geotechnical investigations  
6 (Alternative 5) would be completed in a single day and would involve placing approximately 20 ERT  
7 probes 0.5 inch in diameter. The study would be conducted entirely on foot, perpendicular to the  
8 tunneled portion of the Bethany Reservoir Aqueduct (Delta Conveyance Design and Construction  
9 Authority 2022a, 2022b). The Bethany Fault Study could result in minor disruption of normal  
10 behaviors, but because of its small footprint and the short (1-day) duration of the disturbance,  
11 impacts on modeled habitat are not quantified and are considered negligible. The West Tracy Fault  
12 investigations and the tunnel alignments for Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c would not  
13 affect modeled habitat for San Joaquin kit fox. Utility potholing would also occur within the  
14 footprints for the Bethany Reservoir Aqueduct and the Bethany Reservoir Discharge Structure and  
15 would temporarily affect habitats. These temporary impacts are not characterized as an additional  
16 loss of habitat because impacts for these locations have already been quantified within the  
17 construction footprints but could still result in the potential for injury, mortality, and the disruption  
18 of normal behaviors of San Joaquin kit fox as discussed above for conveyance facility construction.  
19 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
20 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
21 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
22 *Biological Resources* (Appendix 3B) would reduce the potential for injury and mortality by (1)  
23 training construction staff on protecting San Joaquin kit fox, reporting requirements, and the  
24 ramifications for not following these measures; (2) having a biological monitor present to ensure  
25 that non-disturbance buffers and associated construction fencing are intact and all other protective  
26 measures are being implemented; (3) ensuring trenches are covered at the end of the day or escape  
27 ramps are installed; (4) limiting construction vehicle traffic to a maximum speed limit of 15 miles  
28 per hour; (5) properly disposing of trash; (6) reducing the potential for discharge of construction  
29 materials in areas of potential habitat; and (7) keeping the work area free of firearms and pets.

### 30 Operations

31 Alternative 5 has the potential for impacts on San Joaquin kit fox during operations from vehicle  
32 traffic on the access road leading to the Bethany Reservoir Discharge Structure, which could result  
33 in the injury, mortality, and disruption of normal behaviors.

### 34 Maintenance

35 The maintenance of the Bethany Reservoir Discharge Structure and associated access road under  
36 Alternative 5, which would include repaving of access roads every 15 years, semiannual general and  
37 ground maintenance (e.g., mowing, vegetation trimming, herbicide application), and daily/weekly  
38 inspections by vehicle could result in impacts on San Joaquin kit fox, including injury, mortality, and  
39 disruption of normal behaviors.

### 40 **CEQA Conclusion—All Project Alternatives**

41 Construction of Alternative 5 would result in permanent and temporary losses of modeled San  
42 Joaquin kit fox habitat. Taking into consideration that the permanently affected San Joaquin kit fox  
43 modeled habitat is almost all modeled as low-quality habitat (38 acres of low-quality habitat relative

1 to 0.01 acre of high-quality habitat) and that the USFWS considers that there is no evidence of a  
2 current population in this portion of the species range (U.S. Fish and Wildlife Service 2020a:50), the  
3 loss of modeled habitat would be less than significant and therefore no compensatory mitigation is  
4 being proposed specifically for San Joaquin kit fox, The purchasing of conservation credits for  
5 California red-legged frog and California tiger salamander at a USFWS- and CDFW-approved  
6 mitigation bank or other approved conservation areas (Appendix 3F, Section 3F.3.3.3 and  
7 Attachment 3F.1, Table 3F.1-3, CMP-13: *California Tiger Salamander Habitat* and CMP-14: *California*  
8 *Red-Legged Frog Habitat*) would contain upland grasslands potentially suitable for San Joaquin kit  
9 fox, providing a potential benefit if a population were to establish in the northern portion of the  
10 species range. There would be no permanent or temporary losses of modeled habitat under  
11 Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, or 4c.

12 Though the likelihood of San Joaquin kit fox occurring in the study area is low, there is still a  
13 potential for dispersing individuals to show up at some point and therefore construction of all  
14 project alternatives and the operations and maintenance under Alternative 5 would result in  
15 impacts on San Joaquin kit fox through the potential for injury, mortality, and the disruption of  
16 normal behaviors. The potential impacts of injury, mortality, and the disruption of normal behaviors  
17 from project construction would be reduced by Environmental Commitments EC-1: *Conduct Worker*  
18 *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
19 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
20 *Construction Best Management Practices for Biological Resources* (Appendix 3B); however, even with  
21 these commitments, the potential for San Joaquin kit fox injury, mortality, and disruption of normal  
22 behaviors from construction of the project alternatives and from operations and maintenance under  
23 Alternative 5 would be significant. Mitigation Measures BIO-2b: *Avoid and Minimize Impacts on*  
24 *Terrestrial Biological Resources from Maintenance Activities*, BIO-22b: *Avoid and Minimize*  
25 *Operational Traffic Impacts on Wildlife*, and BIO-46: *Conduct Preconstruction Survey for San Joaquin*  
26 *Kit Fox and Implement Avoidance and Minimization Measures* would avoid and minimize the  
27 potential for injury, mortality, and disruption of normal behaviors. The impacts on San Joaquin kit  
28 fox from the project alternatives would be less than significant with mitigation because the  
29 aforementioned measures would reduce direct effects on the species by (1) implementing protective  
30 measures during maintenance activities, which would include conducting den surveys where  
31 appropriate and avoiding certain activities where possible, and (2) implementing traffic controls on  
32 facility access roads during operations, which would minimize the potential for vehicle strikes if San  
33 Joaquin kit fox is present in these areas.

#### 34 **Mitigation Measure CMP: Compensatory Mitigation Plan**

35 The CMP that DWR would implement (see Impact BIO-1 for a summary discussion of the CMP)  
36 does not include specific compensatory mitigation for San Joaquin kit fox. The proposed  
37 mitigation for California tiger salamander and California red-legged frog (Appendix 3F, Section  
38 3F.3.3.3 and Attachment 3F.1, Table 3F.1-3, CMP-13: *California Tiger Salamander Habitat* and  
39 CMP-14: *California Red-Legged Frog Habitat*) could provide benefits to San Joaquin kit fox  
40 through the protection of grasslands associated with aquatic habitats. As specified in  
41 Attachment 3F.1, Table 3F.1-3, CMP-13: *California Tiger Salamander Habitat* and CMP-14:  
42 *California Red-Legged Frog Habitat*, mitigation for those species would be prioritized in recovery  
43 areas for both species, which overlap with the range of San Joaquin kit fox.

1       **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
2       **Resources from Maintenance Activities**

3       See description of Mitigation Measure BIO-2b under Impact BIO-2.

4       **Mitigation Measure BIO-22b: Avoid and Minimize Operational Traffic Impacts on Wildlife**

5       See description of Mitigation Measure BIO-22b under Impact BIO-22.

6       **Mitigation Measure BIO-46: Conduct Preconstruction Survey for San Joaquin Kit Fox and**  
7       **Implement Avoidance and Minimization Measures**

8       As properties become accessible for initiating project activities within areas of modeled San  
9       Joaquin kit fox habitat, DWR will require suitability assessments of the modeled habitat by a  
10      biologist qualified to identify suitable habitat for this species.

- 11      1. For areas verified as being suitable for San Joaquin kit fox, preconstruction surveys will be  
12      initiated within 14 to 30 days prior to ground disturbance, vegetation removal, or  
13      establishment of staging areas related to project activities. A USFWS- and CDFW-approved  
14      biologist with experience surveying for and observing the species will survey the project  
15      footprint and the area within 200 feet beyond the footprint to identify known or potential  
16      San Joaquin kit fox dens. Adjacent parcels under different land ownership will not be  
17      surveyed unless access is granted within the 200-foot radius of the project footprint. The  
18      biologists will conduct these searches by systematically walking 30- to 100-foot-wide  
19      transects throughout the survey area; transect width will be adjusted based on vegetation  
20      height and topography. The biologist will conduct walking transects such that 100% visual  
21      coverage of the worksite footprint is achieved. Dens will be classified in one of the following  
22      four den status categories outlined in the *Standardized Recommendations for Protection of*  
23      *the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (U.S. Fish and  
24      Wildlife Service 2011:8–9).
- 25      a. **Potential den.** Any subterranean hole within the species' range that has entrances of  
26      appropriate dimensions for which available evidence is sufficient to conclude that it is  
27      being used or has been used by a San Joaquin kit fox. Potential dens comprise any  
28      suitable subterranean hole or any den or burrow of another species (e.g., coyote, badger,  
29      red fox, or ground squirrel) that otherwise has appropriate characteristics for kit fox  
30      use. If a potential den is found, the biologist will establish a 50-foot buffer using flagging.
- 31      b. **Known den.** Any existing natural den or artificial structure that is used or has been  
32      used at any time in the past by a San Joaquin kit fox. Evidence of use may include  
33      historical records; past or current radiotelemetry or spotlighting data; kit fox sign such  
34      as tracks, scat, or prey remains; or other reasonable proof that a den is being or has  
35      been used by a kit fox. If a known den is found, the biologist will establish a 100-foot  
36      buffer using flagging.
- 37      c. **Natal or pupping den.** Any den used by San Joaquin kit foxes to whelp or rear their  
38      pups. Natal or pupping dens may be larger with more numerous entrances than dens  
39      occupied exclusively by adults. These dens typically have more kit fox tracks, scat, and  
40      prey remains near the den and may have a broader apron of matted dirt or vegetation at  
41      one or more entrances. A natal den, defined as a den in which kit fox pups are actually  
42      whelped but not necessarily reared, is a more restrictive version of the pupping den. In

1 practice, however, it is difficult to distinguish between the two types of dens; therefore,  
2 for purposes of this definition, either term applies. If a natal or pupping den is  
3 discovered, the biologist will establish a buffer of at least 200 feet will be established  
4 using fencing but a final buffer will be established in coordination with USFWS and  
5 CDFW.

6 d. **Atypical den.** Any artificial structure that has been or is being occupied by a San  
7 Joaquin kit fox. Atypical dens may include pipes, culverts, and diggings beneath concrete  
8 slabs and buildings. If an atypical den is discovered, the biologist will establish a 50-foot  
9 buffer using flagging.

- 10 2. Disturbance to all San Joaquin kit fox den status categories (described directly above) will  
11 be avoided to the extent possible. Where avoidance is not possible, limited den destruction  
12 may be allowed provided the following procedures are observed.
- 13 3. If an atypical, natal or pupping, known or potential San Joaquin kit fox den is discovered  
14 within a project footprint, the den will be monitored for 3 days by a USFWS- and CDFW-  
15 approved biologist using a tracking medium or an infrared beam camera to determine if the  
16 den is currently being used.
- 17 4. If an active natal or pupping den is found within a project footprint, USFWS and CDFW will  
18 be notified immediately. The den will not be destroyed until the pups and adults have  
19 vacated and then only after further coordination with USFWS and CDFW.
- 20 5. If San Joaquin kit fox activity is observed at the potential, known, or atypical den during the  
21 preconstruction surveys, den use will be actively discouraged with the approval of the  
22 USFWS- and CDFW-approved biologist, as described below, and monitoring will continue for  
23 an additional 5 consecutive days from the time of the first observation to allow any resident  
24 animals to move to another den. For dens other than natal or pupping dens, use of the den  
25 can be discouraged by partially plugging the entrance with soil such that any resident  
26 animal can easily escape. Alternatively, if the animal is still present after 5 or more  
27 consecutive days of plugging and monitoring, the den may have to be excavated by hand  
28 when, in the judgment of a biologist, it is temporarily vacant (i.e., during the animal's normal  
29 foraging activities). If at any point during excavation a San Joaquin kit fox is discovered  
30 inside the den, the excavation activity will cease immediately and monitoring of the den, as  
31 described above, will be resumed. Destruction of the den may be completed when, in the  
32 judgment of the biologist, the animal has escaped from the partially destroyed den.
- 33 6. Construction requirements from *Standardized Recommendations for Protection of the San*  
34 *Joaquin Kit Fox Prior to or during Ground Disturbance* (U.S. Fish and Wildlife Service 2011:5-  
35 9) or the latest guidelines will be implemented.
- 36 7. If potential, known, atypical, or natal or pupping dens are identified within temporary work  
37 areas or within a 200-foot buffer of a temporary work area, exclusion zones around each  
38 den entrance or cluster of entrances will be demarcated. The configuration of exclusion  
39 zones will be circular, with a radius measured outward from the den entrance(s). No  
40 activities will occur within the exclusion zones. Exclusion zone radii for atypical dens and  
41 potential dens will be at least 50 feet and will be demarcated with four to five flagged stakes.  
42 Exclusion zone radii for known dens will be at least 100 feet and will be demarcated with  
43 staking and flagging that encircle each den or cluster of dens but do not prevent access to  
44 the den by the foxes.

1 8. Written results of the surveys will be submitted to USFWS and CDFW within 5 calendar days  
2 of the completion of surveys and prior to the beginning of ground disturbance and/or  
3 construction activities in San Joaquin kit fox modeled habitat.

4 During construction, the following measures will be implemented for all activities in suitable  
5 San Joaquin kit fox habitat (as determined by a USFWS- and CDFW-approved biologist):

6 9. The USFWS- and CDFW-approved biologist for San Joaquin kit fox will be the contact source  
7 for any employee or contractor who might incidentally kill or injure a kit fox or who finds a  
8 dead, injured, or entrapped kit fox.

9 10. Any personnel who are responsible for incidentally killing or injuring a San Joaquin kit fox  
10 will immediately report the incident to the USFWS- and CDFW-approved biologist. The  
11 USFWS- and CDFW-approved biologist will contact USFWS immediately in the case of a  
12 dead, injured, or entrapped kit fox.

13 11. USFWS and CDFW will be notified immediately of the accidental death or injury to a San  
14 Joaquin kit fox. Notification must include the date, time, and location of the incident or of the  
15 finding of a dead or injured animal and any other pertinent information. The USFWS contact  
16 is the Assistant Field Supervisor of Endangered Species.

17 12. New sightings of kit fox will be reported to the CNDDDB. A copy of the reporting form and a  
18 topographic map clearly marked with the location of where the kit fox was observed will  
19 also be provided to USFWS at the address below.

## 20 ***Mitigation Impacts***

21 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
22 mitigation measure impacts. The analyses below consider the potential impacts associated with  
23 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
24 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
25 *Measures*.

## 26 *Compensatory Mitigation*

27 Implementation of the compensatory mitigation plan would not result in impacts on San Joaquin kit  
28 fox because Bouldin Island and the I-5 ponds as well as the potential locations of tidal restoration  
29 and channel margin enhancement, where habitat creation and enhancement are planned, are well  
30 outside the known range of the species.

31 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
32 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
33 vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located, depending  
34 on the location these areas could potentially be used by dispersing San Joaquin kit foxes though the  
35 likelihood is low. The USFWS considers that there is no evidence of a current population in the  
36 northern portion of the species range, where these activities would likely take place (U.S. Fish and  
37 Wildlife Service 2020a:50). Site-specific analyses are not provided because locations of potential  
38 non-bank sites are not currently known.

39 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
40 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
41 management of agricultural areas but may also include natural communities in the study area

1 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
2 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
3 *CMP-19b: Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
4 *CMP-22b: Tricolored Blackbird Foraging Habitat*). These areas would not likely be within the range  
5 of the species and therefore no effects are anticipated. Site-specific analyses are not provided  
6 because locations of potential protection instruments are not currently known.

7 The impact on San Joaquin kit fox from the project with the CMP would be less than significant with  
8 mitigation.

### 9 Other Mitigation Measures

10 Some mitigation measures would involve ground disturbance and the use of heavy equipment that  
11 would have the potential to result in loss of modeled habitat or result in injury, mortality, and the  
12 disruption of normal behaviors from ground disturbance, increased traffic volume, and the  
13 inadvertent discharge of construction-related fluids such as fuels, oils, and cement. Impacts on San  
14 Joaquin kit fox resulting from mitigation measures would be similar to construction effects of the  
15 project alternatives in certain construction areas and would contribute to impacts of the project  
16 alternatives on San Joaquin kit fox.

17 The impacts of habitat loss, ground disturbance, increased traffic, and exposure to hazardous  
18 materials on San Joaquin kit fox from mitigation measures would be reduced through  
19 Environmental Commitment EC-1: *Conduct Worker Awareness Training*, and Mitigation Measures  
20 BIO-2b: *Avoid and Minimize Impacts on Terrestrial Biological Resources from Maintenance Activities*,  
21 BIO-22b: *Avoid and Minimize Operational Traffic Impacts on Wildlife*, and BIO-46: *Conduct*  
22 *Preconstruction Survey for San Joaquin Kit Fox and Implement Avoidance and Minimization Measures*.  
23 Therefore, impacts on San Joaquin kit fox from implementation of other mitigation measures would  
24 be reduced to less than significant.

25 Overall, the impacts on San Joaquin kit fox from construction of compensatory mitigation and  
26 implementation of other mitigation measures, combined with project alternatives, would not change  
27 the impact conclusion of less than significant with mitigation.

### 28 **Impact BIO-47: Impacts of the Project on American Badger**

29 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
30 information on the species life history and habitat suitability model for American badger are  
31 presented in the species account in Appendix 13B, Section 13B.102, *American Badger*.

### 32 All Project Alternatives

#### 33 Construction

34 The construction of all the project alternatives would affect modeled habitat for American badger.  
35 Construction effects would include the permanent and temporary loss of habitat and habitat  
36 fragmentation. The loss of habitat would result from most project activities, with the largest  
37 contributors being levee improvements, the South Delta Outlet and Control Structure (Alternatives  
38 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c), the Jones Outlet and Control Structure (Alternatives 2a and 4a), the  
39 Bethany Reservoir Discharge Structure (Alternative 5), and the construction of new roads and road  
40 improvements (all alternatives) (Appendix 13C). The central alignment alternatives (Alternatives 1,

1 2a, 2b, and 2c) would result in greater impacts on modeled habitat compared to the eastern  
 2 alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and the Bethany Reservoir alignment  
 3 alternative (Alternative 5) largely because of the levee improvements on Bouldin Island and road  
 4 improvements required for the central alignment (Table 13-95). The loss of habitat would result  
 5 from vegetation removal in advance of grading and excavation for the construction of project  
 6 infrastructure. Construction of all alternatives would result in the fragmentation of habitat in the  
 7 area west of Byron Highway. Environmental Commitment EC-14: *Construction Best Management  
 8 Practices for Biological Resources* would ensure that temporarily disturbed areas are restored  
 9 (Appendix 3B).

10 **Table 13-95. Impacts on Modeled Habitat for American Badger by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	170.21	42.03	212.24
2a	238.97	51.75	290.72
2b	153.60	49.29	202.89
2c	161.58	50.18	211.76
3	102.87	34.17	137.04
4a	180.20	35.74	215.94
4b	94.85	33.27	128.12
4c	102.81	34.17	136.98
5	64.71	32.45	97.16

11 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
 12 discussion in Section 13.3.1.2.  
 13

14 Construction activities for all project alternatives could result in the injury, mortality, and disruption  
 15 of foraging, breeding, and dispersal of American badgers. These effects could result from project  
 16 grading, excavation, the use of construction-related vehicles, and exposure of badgers to  
 17 construction-related fluids, such as fuels, oils, and cement. Environmental Commitments EC-1:  
 18 *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management  
 19 Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and  
 20 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would  
 21 reduce the potential for injury and mortality by (1) training construction staff on protecting  
 22 American badger, reporting requirements, and the ramifications for not following these measures;  
 23 (2) having a biological monitor present to ensure that non-disturbance buffers and associated  
 24 construction fencing are intact and all other protective measures are being implemented; (3)  
 25 ensuring trenches are covered at the end of the day or escape ramps are installed; (4) limiting  
 26 construction vehicle traffic to a maximum speed limit of 15 miles per hour on unpaved non-public  
 27 construction access roads; (5) properly disposing of trash; (6) reducing the potential for discharge  
 28 of construction materials in areas of potential habitat; and (7) keeping the work area free of  
 29 firearms and pets.

30 Two CNDDDB occurrences overlap with the project alternative footprints (California Department of  
 31 Fish and Wildlife 2020a). One occurrence (#209) from 1938 overlaps with the Intake B  
 32 (Alternatives 1, 2a, 2c, 3, 4a, 4c, and 5) and associated improvements and the other occurrence  
 33 (#397) from 2007, a roadkill, overlaps with the SCADA construction area on Kelso Road as part of  
 34 Alternative 5 (California Department of Fish and Wildlife 2020a).



1 Field investigations for all project alternatives would be conducted prior to and during construction  
2 to more specifically identify appropriate construction methods and design criteria addressed in the  
3 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
4 and address the establishment of geological and groundwater monitoring programs (Delta  
5 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
6 variety of ground-disturbing activities that would vary in duration from several hours to  
7 approximately 6 weeks (Section 3.15; Delta Conveyance Design and Construction Authority 2022a,  
8 2022b) and could result in impacts on habitat, the potential for injury, mortality, and the disruption  
9 of normal behaviors of American badger. Geotechnical investigations that would occur in the West  
10 Tracy Fault Study area, the main tunnels, the tunnels linking the Southern Forebay to the South  
11 Delta Outlet and Control Structure (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c), and the tunnel for  
12 the Bethany Reservoir Aqueduct (Alternative 5), which include test trenches, CPTs, soil borings, and  
13 geophysical arrays, would result in temporary impacts on habitat (Appendix 13C). The Bethany  
14 Fault Study geotechnical investigations (Alternative 5) would be completed in a single day and  
15 would involve placing approximately 20 ERT probes 0.5 inch in diameter. The study would be  
16 conducted entirely on foot, perpendicular to the tunneled portion of the Bethany Reservoir  
17 Aqueduct (Delta Conveyance Design and Construction Authority 2022a, 2022b). The Bethany Fault  
18 Study could result in minor disruption of normal behaviors, but because of its small footprint and  
19 the short (1-day) duration of the disturbance, impacts on modeled habitat are not quantified and are  
20 considered negligible. The following field investigations would be conducted within proposed  
21 surface construction footprints of project facilities (including portions of tunnel alignments) and  
22 would temporarily affect habitat: test trenches, CPTs, soil borings, ERT, groundwater testing and  
23 monitoring, monument installation, pilot studies for settlement, agronomic testing, and utility  
24 potholing. These temporary impacts are not characterized as an additional loss of habitat because  
25 impacts for these locations have already been quantified within the construction footprints but  
26 could still result in the potential for injury, mortality, and the disruption of normal behaviors of  
27 American badger as discussed above for conveyance facility construction. Environmental  
28 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
29 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
30 *Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
31 (Appendix 3B) would reduce the potential for injury and mortality by (1) training construction staff  
32 on protecting American badger, reporting requirements, and the ramifications for not following  
33 these measures; (2) having a biological monitor present to ensure that non-disturbance buffers and  
34 associated construction fencing are intact and all other protective measures are being implemented;  
35 (3) ensuring trenches are covered at the end of the day or escape ramps are installed; (4) limiting  
36 construction vehicle traffic to a maximum speed limit of 15 miles per hour; (5) properly disposing of  
37 trash; (6) reducing the potential for discharge of construction materials in areas of potential habitat;  
38 and (7) keeping the work area free of firearms and pets.

### 39 Operations

40 All project alternatives have the potential for impacts on American badger from vehicle traffic on  
41 access roads to project facilities during operations, which could result in the injury, mortality, and  
42 disruption of normal behaviors.

## 1 Maintenance

2 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
3 in impacts on American badger. Maintenance activities across all facilities that could affect American  
4 badger include repaving of access roads every 15 years, semiannual general and ground  
5 maintenance (e.g., mowing, vegetation trimming, herbicide application), and daily or weekly  
6 inspections by vehicle could result in the injury, mortality, and disruption of normal behaviors (i.e.,  
7 foraging, breeding, and dispersal) of American badger. Maintenance at the Southern Forebay  
8 (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) would include annual embankment repair and quarterly  
9 animal burrow filling, which could also result in the injury, mortality, and disruption of normal  
10 behaviors.

## 11 **CEQA Conclusion—All Project Alternatives**

12 The construction, operations, and maintenance of all project alternatives would result in impacts on  
13 American badger through the permanent and temporary loss of modeled habitat, habitat  
14 fragmentation, and the potential for injury, mortality, and the disruption of normal behaviors. The  
15 temporary loss of habitat and the potential impacts of injury, mortality, and the disruption of normal  
16 behaviors of American badger from project construction would be reduced by Environmental  
17 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
18 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
19 *Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
20 (Appendix 3B); however, even with these commitments, the loss of habitat from the construction of  
21 the alternatives and the potential for injury, mortality, and disruption of normal behaviors from  
22 construction, operations, and maintenance on American badger would be significant. The CMP  
23 would offset the loss of modeled habitat by creating and protecting grasslands on Bouldin Island  
24 (Appendix 3F, Section 3F.3.3.2) and through the protection of upland grasslands with the purchase  
25 of conservation credits at an USFWS- and CDFW--approved mitigation bank for California red-legged  
26 frog and California tiger salamander (Appendix 3F, Section 3F.3.3.3 and Attachment 3F.1, Table  
27 3F.1-3, CMP-13: *California Tiger Salamander Habitat* and CMP-14: *California Red-Legged Frog*  
28 *Habitat*), which could be used by American badger, would reduce the impact associated with habitat  
29 loss to less than significant. Mitigation Measures BIO-2b: *Avoid and Minimize Impacts on Terrestrial*  
30 *Biological Resources from Maintenance Activities*, BIO-22b: *Avoid and Minimize Operational Traffic*  
31 *Impacts on Wildlife*, and BIO-47: *Conduct Preconstruction Survey for American Badger and Implement*  
32 *Avoidance and Minimization Measures* would be required to avoid and minimize the potential for  
33 injury, mortality, disruption of normal behaviors, and disturbances to habitat. The impacts on  
34 American badger from the project alternatives would be less than significant with mitigation  
35 because the aforementioned measures would replace lost habitat and reduce direct effects on the  
36 species, including habitat disturbance, by (1) implementing protective measures during  
37 maintenance activities, which would include assessing work areas for habitat and conducting dens  
38 surveys where appropriate and avoiding certain activities where possible, (2) implementing traffic  
39 controls on facility access roads during operations, which would minimize the potential for vehicle  
40 strikes, and (3) implementing avoidance measures for active dens during construction.

## 41 **Mitigation Measure CMP: Compensatory Mitigation Plan**

42 The CMP that DWR would implement (see Impact BIO-1 for a summary discussion of the CMP)  
43 does not include specific compensatory mitigation for American badger; however, with its  
44 creation and protection of grasslands on Bouldin Island (Appendix 3F, Section 3F.3.3.2) and

1 through the protection of upland grasslands as part of California red-legged frog and California  
2 tiger salamander mitigation (Appendix 3F, Section 3F.3.3.3 and Attachment 3F.1, Table 3F.1-3,  
3 CMP-13: *California Tiger Salamander Habitat* and CMP-14: *California Red-Legged Frog Habitat*),  
4 habitat that could be used by American badger would be conserved.

5 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
6 **Resources from Maintenance Activities**

7 See description of Mitigation Measure BIO-2b under Impact BIO-2.

8 **Mitigation Measure BIO-22b: Avoid and Minimize Operational Traffic Impacts on Wildlife**

9 See description of Mitigation Measure BIO-22b under Impact BIO-22.

10 **Mitigation Measure BIO-47: Conduct Preconstruction Survey for American Badger and**  
11 **Implement Avoidance and Minimization Measures**

12 ***All Project Alternatives***

13 DWR will require a qualified biologist to survey for American badger concurrently with the  
14 preconstruction surveys for burrowing owl within 14 days prior to the start of ground  
15 disturbance. If an active den is detected within the work area, DWR will establish a suitable  
16 buffer distance and avoid the den until the biologist determines that the den is no longer active  
17 through direct monitoring, using wildlife cameras, or using a camera probe. Potential dens that  
18 are determined to be inactive by one or more of the aforementioned methods will be collapsed  
19 by hand to prevent occupation of the den between the time of the survey and construction  
20 activities.

21 ***Mitigation Impacts***

22 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
23 mitigation measure impacts. The analyses below consider the potential impacts associated with  
24 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
25 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
26 *Measures*.

27 **Compensatory Mitigation**

28 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
29 species on Bouldin Island and at the I-5 ponds under the project's CMP would affect modeled habitat  
30 for American badger (Appendix 13C) from vegetation removal and grading to create the appropriate  
31 topography and soil conditions to establish or restore habitats. The CMP could also affect American  
32 badger through tidal wetland habitat restoration and channel margin enhancement because  
33 potential areas identified generally overlap with modeled habitat (Appendix 3F, Section 3F.4.3.4.2).

34 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
35 enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in the temporary  
36 disturbance of existing American badger habitat and the potential for disruption of normal  
37 behaviors, injury, or mortality of the species. Site-specific analyses are not provided because  
38 locations of potential non-bank sites are not currently known.

1 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
2 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
3 management of agricultural areas but may also include natural communities in the study area  
4 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
5 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
6 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
7 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could potentially contain grasslands  
8 suitable for American badger and management activities could affect this habitat and result in the  
9 disruption of normal behaviors, injury, and mortality. Site-specific analyses are not provided  
10 because locations of potential protection instruments are not currently known.

11 The CMP and site-specific permitting approvals would ensure no significant loss in habitat or habitat  
12 value (Appendix 3F, Section 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General*  
13 *Design Guidelines*) and therefore reduce any habitat losses associated with the CMP to less than  
14 significant. These activities would also have the potential for injury, mortality, and the disruption of  
15 normal behaviors of individuals. Environmental Commitments EC-1: *Conduct Worker Awareness*  
16 *Training*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and  
17 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B); and  
18 Mitigation Measure BIO-47: *Conduct Preconstruction Survey for American Badger and Implement*  
19 *Avoidance and Minimization Measures* would be required to avoid and minimize the potential for  
20 injury, mortality, disruption of normal behaviors, and disturbances to habitat. These impacts would  
21 be less than significant because the aforementioned measures would reduce direct effects on the  
22 species, including habitat disturbance, by (1) training construction staff on protecting American  
23 badger, reporting requirements, and the ramifications for not following these measures; (2)  
24 implementing spill prevention and containment plans that would avoid material spills that could  
25 affect the species; and (3) having a biological monitor present to ensure that non-disturbance  
26 buffers and associated construction fencing are intact and all other protective measures are being  
27 implemented where applicable.

28 The impact on American badger from the project with the CMP would be less than significant with  
29 mitigation.

### 30 Other Mitigation Measures

31 Some mitigation measures would involve ground disturbance and the use of heavy equipment that  
32 would have the potential to result in loss of modeled habitat or result in injury, mortality, and the  
33 disruption of normal behaviors from ground disturbance, increased traffic volume, and the  
34 inadvertent discharge of construction-related fluids such as fuels, oils, and cement. Impacts on  
35 American badger resulting from mitigation measures would be similar to construction effects of the  
36 project alternatives in certain construction areas and would contribute to impacts of the project  
37 alternatives on American badger.

38 The impacts of habitat loss, ground disturbance, increased traffic, and exposure to hazardous  
39 materials on American badger would be reduced through Mitigation Measure BIO-22b: *Avoid and*  
40 *Minimize Operational Traffic Impacts on Wildlife* and the environmental commitments detailed  
41 under Impact BIO-46: *Impacts of the Project on San Joaquin Kit Fox*. In addition, Mitigation Measure  
42 BIO-47: *Conduct Preconstruction Survey for American Badger and Implement Avoidance and*  
43 *Minimization Measures* would require species-specific measures to reduce these impacts. Therefore,

1 impacts on American badger from implementation of other mitigation measures would be reduced  
2 to less than significant.

3 Overall, the impacts on American badger from construction of compensatory mitigation and  
4 implementation of other mitigation measures, combined with project alternatives, would not change  
5 the impact conclusion of less than significant with mitigation.

## 6 **Impact BIO-48: Impacts of the Project on San Joaquin Pocket Mouse**

7 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
8 information on the species life history and habitat suitability model for San Joaquin pocket mouse  
9 are presented in the species account in Appendix 13B, Section 13B.103, *San Joaquin Pocket Mouse*.

## 10 ***All Project Alternatives***

### 11 *Construction*

12 The construction of all the project alternatives would affect modeled habitat for San Joaquin pocket  
13 mouse. Construction effects would include the permanent and temporary loss of habitat and habitat  
14 fragmentation. The loss of habitat would result from most project activities with the largest  
15 contributors being levee improvements, the South Delta Outlet and Control Structure (Alternatives  
16 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c), the Jones Outlet and Control Structure (Alternatives 2a and 4a), the  
17 Bethany Reservoir Discharge Structure (Alternative 5), and the construction of new roads and road  
18 improvements (all alternatives) (Appendix 13C). The central alignment alternatives (Alternatives 1,  
19 2a, 2b, and 2c) would result in greater impacts on modeled habitat compared to the eastern  
20 alignment alternatives (Alternatives 3, 4a, 4b, and 4c) and the Bethany Reservoir alignment  
21 alternative (Alternative 5) largely because of the levee improvements on Bouldin Island and road  
22 improvements required for the central alignment (Table 13-96). The loss of habitat would result  
23 from vegetation removal in advance of grading and excavation for the construction of project  
24 infrastructure. Construction of all project alternatives would result in the fragmentation of habitat in  
25 the area west of Byron Highway. Environmental Commitment EC-14: *Construction Best Management*  
26 *Practices for Biological Resources* would ensure that temporarily disturbed areas are restored  
27 (Appendix 3B).

28 **Table 13-96. Impacts on Modeled Habitat for San Joaquin Pocket Mouse by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
1	170.21	42.03	212.24
2a	238.97	51.75	290.72
2b	153.60	49.29	202.89
2c	161.58	50.18	211.76
3	102.87	34.17	137.04
4a	180.20	35.74	215.94
4b	94.85	33.27	128.12
4c	102.81	34.17	136.98
5	64.70	32.45	97.16

29 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
30 discussion in Section 13.3.1.2.

1 Construction activities for all project alternatives could result in the injury, mortality, and disruption  
2 of feeding, breeding, and dispersal of San Joaquin pocket mouse. These effects could result from  
3 project grading, excavation, the use of construction-related vehicles, and exposure of pocket mice to  
4 construction-related fluids, such as fuels, oils, and cement. Environmental Commitments EC-1:  
5 *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management*  
6 *Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and  
7 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would  
8 reduce the potential for injury and mortality by (1) training construction staff on protecting San  
9 Joaquin pocket mouse, reporting requirements, and the ramifications for not following these  
10 measures; (2) having a biological monitor present to ensure that non-disturbance buffers and  
11 associated construction fencing are intact and all other protective measures are being implemented;  
12 (3) ensuring trenches are covered at the end of the day or escape ramps are installed; (4) limiting  
13 construction vehicle traffic to a maximum speed limit of 15 miles per hour on unpaved, non-public  
14 construction access roads; (5) properly disposing of trash; (6) reducing the potential for discharge  
15 of construction materials in areas of potential habitat; and (7) keeping the work area free of  
16 firearms and pets.

17 One CNDDDB occurrence (#101) for San Joaquin pocket mouse overlaps with the footprint for the  
18 South Delta Outlet and Control Structure and improvements on the UPRR railroad (Alternatives 1,  
19 2a, 2b, 2c, 3, 4a, 4b, and 4c) (California Department of Fish and Wildlife 2020a). This occurrence is  
20 from 2002 and is reported along both sides the California Aqueduct where four adults were  
21 captured (California Department of Fish and Wildlife 2020a).

22 Field investigations for all project alternatives would be conducted prior to and during construction  
23 to more specifically identify appropriate construction methods and design criteria addressed in the  
24 final design documents, verify soil rehabilitation methods, confirm the locations of existing utilities,  
25 and address the establishment of geological and groundwater monitoring programs (Delta  
26 Conveyance Design and Construction Authority 2022a, 2022b). Field investigations would involve a  
27 variety of ground-disturbing activities that would vary in duration from several hours to  
28 approximately 6 weeks (Section 3.15; Delta Conveyance Design and Construction Authority 2022a,  
29 2022b) and could result in impacts on habitat, the potential for injury, mortality, and the disruption  
30 of normal behaviors of San Joaquin pocket mouse. Geotechnical investigations that would occur in  
31 the West Tracy Fault Study area, the main tunnels, the tunnels linking the Southern Forebay to the  
32 South Delta Outlet and Control Structure (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c), and the tunnel  
33 for the Bethany Reservoir Aqueduct (Alternative 5), which include test trenches, CPTs, soil borings,  
34 and geophysical arrays, would result in temporary impacts on habitat (Appendix 13C). The Bethany  
35 Fault Study geotechnical investigations (Alternative 5) would be completed in a single day and  
36 would involve placing approximately 20 ERT probes 0.5 inch in diameter. The study would be  
37 conducted entirely on foot, perpendicular to the tunneled portion of the Bethany Reservoir  
38 Aqueduct (Delta Conveyance Design and Construction Authority 2022a, 2022b). The Bethany Fault  
39 Study could result in minor disruption of normal behaviors, but because of its small footprint and  
40 the short (1-day) duration of the disturbance, impacts on modeled habitat are not quantified and are  
41 considered negligible. The following field investigations would be conducted within proposed  
42 surface construction footprints of project facilities (including portions of tunnel alignments) and  
43 would temporarily affect habitat: test trenches, CPTs, soil borings, ERT, groundwater testing and  
44 monitoring, monument installation, pilot studies for settlement, agronomic testing, and utility  
45 potholing. These temporary impacts are not characterized as an additional loss of habitat because  
46 impacts for these locations have already been quantified within the construction footprints but

1 could still result in the potential for injury, mortality, and the disruption of normal behaviors of San  
2 Joaquin pocket mouse as discussed above for conveyance facility construction. Environmental  
3 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
4 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
5 *Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
6 (Appendix 3B) would reduce the potential for injury and mortality by (1) training construction staff  
7 on protecting San Joaquin pocket mouse, reporting requirements, and the ramifications for not  
8 following these measures; (2) having a biological monitor present to ensure that non-disturbance  
9 buffers and associated construction fencing are intact and all other protective measures are being  
10 implemented; (3) ensuring trenches are covered at the end of the day or escape ramps are installed;  
11 (4) limiting construction vehicle traffic to a maximum speed limit of 15 miles per hour; (5) properly  
12 disposing of trash; (6) reducing the potential for discharge of construction materials in areas of  
13 potential habitat; and (7) keeping the work area free of firearms and pets.

#### 14 Operations

15 All project alternatives have the potential for impacts on San Joaquin pocket mouse from vehicle  
16 traffic on access roads to project facilities during operations, which could result in the injury,  
17 mortality, and disruption of normal behaviors.

#### 18 Maintenance

19 The maintenance of aboveground water conveyance facilities for all project alternatives could result  
20 in impacts on San Joaquin pocket mouse. Maintenance activities across all facilities that could impact  
21 San Joaquin pocket mouse include repaving of access roads every 15 years, semiannual general and  
22 ground maintenance (e.g., mowing, vegetation trimming, herbicide application), and daily or weekly  
23 inspections by vehicle could result in the injury, mortality, and disruption of normal behaviors (i.e.,  
24 foraging, breeding, and dispersal) of San Joaquin pocket mouse. Maintenance at the Southern  
25 Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) would include annual embankment repair and  
26 quarterly animal burrow filling, which could also result in the injury, mortality, and disruption of  
27 normal behaviors.

#### 28 **CEQA Conclusion—All Project Alternatives**

29 The construction, operations, and maintenance of all project alternatives would result in impacts on  
30 San Joaquin pocket mouse through the permanent and temporary loss of habitat, habitat  
31 fragmentation, and the potential for injury, mortality, and the disruption of normal behaviors. The  
32 temporary loss of habitat and the potential impacts of injury, mortality, and the disruption of normal  
33 behaviors of San Joaquin pocket mouse from project construction would be reduced by  
34 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
35 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
36 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
37 *Biological Resources* (Appendix 3B); however, even with these commitments, the loss of habitat from  
38 the construction of the alternatives and the potential for injury, mortality, and disruption of normal  
39 behaviors from construction, operations, and maintenance on San Joaquin pocket mouse would be  
40 significant. The CMP would offset the loss of modeled habitat by creating and protecting grasslands  
41 on Bouldin Island (Appendix 3F, Section 3F.3.3.2) and through the protection of upland grasslands  
42 with the purchase of conservation credits at an USFWS- and CDFW--approved mitigation bank for  
43 California red-legged frog and California tiger salamander (Appendix 3F, Section 3F.3.3.3 and

1 Attachment 3F.1, Table 3F.1-3, CMP-13: *California Tiger Salamander Habitat* and CMP-14: *California*  
2 *Red-Legged Frog Habitat*), which could be used by San Joaquin pocket mouse, would reduce the  
3 impact associated with habitat loss to less than significant. Mitigation Measures BIO-2b: *Avoid and*  
4 *Minimize Impacts on Terrestrial Biological Resources from Maintenance Activities* and BIO-22b: *Avoid*  
5 *and Minimize Operational Traffic Impacts on Wildlife* would be required to avoid and minimize the  
6 potential for injury, mortality, disruption of normal behaviors, and disturbances to habitat. The  
7 impacts on San Joaquin pocket mouse from the project alternatives would be less than significant  
8 with mitigation because these measures would replace lost habitat and reduce direct effects on the  
9 species, including habitat disturbance, by implementing protective measures during maintenance  
10 activities, which would include assessing work areas for potential habitat, and by implementing  
11 traffic controls on facility access roads during operations, which would minimize the potential for  
12 vehicle strikes.

### 13 **Mitigation Measure CMP: Compensatory Mitigation Plan**

14 The CMP that DWR would implement (see Impact BIO-1 for a summary discussion of the CMP)  
15 does not include specific compensatory mitigation for San Joaquin pocket mouse; however, with  
16 the CMP's creation and protection of grasslands on Bouldin Island (Appendix 3F, Section  
17 3F.3.3.2) and through the protection of upland grasslands as part of California red-legged frog  
18 and California tiger salamander mitigation, which would involve purchasing conservation  
19 credits at a USFWS- and CDFW-approved conservation bank (Appendix 3F, Section 3F.3.3.3 and  
20 Attachment 3F.1, Table 3F.1-3, CMP-13: *California Tiger Salamander Habitat* and CMP-14:  
21 *California Red-Legged Frog Habitat*), habitat that could be used by San Joaquin pocket mouse  
22 would be conserved.

### 23 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 24 **Resources from Maintenance Activities**

25 See description of Mitigation Measure BIO-2b under Impact BIO-2.

### 26 **Mitigation Measure BIO-22b: Avoid and Minimize Operational Traffic Impacts on Wildlife**

27 See description of Mitigation Measure BIO-22b under Impact BIO-22.

### 28 ***Mitigation Impacts***

29 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
30 mitigation measure impacts. The analyses below consider the potential impacts associated with  
31 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
32 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
33 *Measures*.

#### 34 *Compensatory Mitigation*

35 The creation and enhancement of wetlands and other waters as well as habitat for special-status  
36 species on Bouldin Island and at the I-5 ponds under the project's CMP would affect modeled habitat  
37 for San Joaquin pocket mouse (Appendix 13C) from vegetation removal and grading to create the  
38 appropriate topography and soil conditions to establish or restore habitats. The CMP could also  
39 affect San Joaquin pocket mouse through tidal wetland habitat restoration and channel margin



1 enhancement because potential areas identified generally overlap with modeled habitat (Appendix  
2 3F, Section 3F.4.3.4.2).

3 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
4 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
5 vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located and could  
6 result in the disturbance of San Joaquin pocket mouse habitat and the potential for disruption of  
7 normal behaviors, injury, or mortality of the species. Site-specific analyses are not provided because  
8 locations of potential non-bank sites are not currently known.

9 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
10 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
11 management of agricultural areas but may also include natural communities in the study area  
12 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
13 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
14 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
15 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas could potentially contain grasslands  
16 suitable for San Joaquin pocket mouse and management activities could affect this habitat and result  
17 in the disruption of normal behaviors, injury, and mortality. Site-specific analyses are not provided  
18 because locations of potential protection instruments are not currently known.

19 The CMP and site-specific permitting approvals would ensure no significant loss in habitat or habitat  
20 value (Appendix 3F, Section 3F.1, Section 3F.2.4, and Attachment 3F.1, Table 3F.1-2, CMP-0: *General*  
21 *Design Guidelines*) and therefore reduce any habitat losses associated with the CMP to less than  
22 significant. These activities would also have the potential for injury, mortality, and the disruption of  
23 normal behaviors of individuals. Environmental Commitments EC-1: *Conduct Worker Awareness*  
24 *Training*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and  
25 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would be  
26 required to avoid and minimize the potential for injury, mortality, disruption of normal behaviors,  
27 and disturbances to habitat. These impacts would be less than significant because the  
28 aforementioned measures would reduce direct effects on the species, including habitat disturbance,  
29 by (1) training construction staff on protecting sensitive biological resources, reporting  
30 requirements, and the ramifications for not following these measures; (2) implementing spill  
31 prevention and containment plans that would avoid material spills that could affect the species; (3)  
32 having a biological monitor present to ensure that non-disturbance buffers and associated  
33 construction fencing are intact, and all other protective measures are being implemented where  
34 applicable.

35 The impact on San Joaquin pocket mouse from the project with the CMP would be less than  
36 significant with mitigation.

### 37 Other Mitigation Measures

38 Some mitigation measures would have impacts on San Joaquin pocket mouse similar to those  
39 described for American badger under Impact BIO-47: *Impacts of the Project on American Badger*.

40 The impacts of ground disturbance and the use of heavy equipment on San Joaquin pocket mouse  
41 would be reduced through Mitigation Measure BIO-22b: *Avoid and Minimize Operational Traffic*  
42 *Impacts on Wildlife*, and the environmental commitments detailed under Impact BIO-46: *Impacts of*

1 *the Project on San Joaquin Kit Fox*. Therefore, impacts on San Joaquin pocket mouse from  
2 implementation of other mitigation measures would be reduced to less than significant.

3 Overall, the impacts on San Joaquin pocket mouse from construction of compensatory mitigation  
4 and implementation of other mitigation measures, combined with project alternatives, would not  
5 change the impact conclusion of less than significant with mitigation.

#### 6 **Impact BIO-49: Impacts of the Project on Salt Marsh Harvest Mouse**

7 The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
8 information on the species life history and habitat suitability model for salt marsh harvest mouse  
9 are presented in the species account in Appendix 13B, Section 13B.104, *Salt Marsh Harvest Mouse*.

#### 10 ***All Project Alternatives***

##### 11 Construction

12 The construction of the project alternatives, including field investigations, would not affect salt  
13 marsh harvest mouse (Table 13-97). The modeled habitat for salt marsh harvest mouse depicted in  
14 Figure 13B.104-1 is more than 9 miles from the nearest project infrastructure (i.e., the park-and-  
15 ride lot on SR 12), which is approximately 10 miles from the nearest CNDDDB record (California  
16 Department of Fish and Wildlife 2020a).

17 **Table 13-97. Impacts on Modeled Habitat for Salt Marsh Harvest Mouse by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
All alternatives	0.00	0.00	0.00

18 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
19 discussion in Section 13.3.1.2.  
20

##### 21 Operations

22 Based on model results presented in Chapter 9, *Water Quality*, the operation of the project for all  
23 alternatives would be expected to result in increases in salinity levels (measured as electrical  
24 conductivity) during the months of October through April at Collinsville, which is close to the  
25 eastern extent of salt marsh harvest mouse habitat in the study area, with the greatest changes  
26 occurring in March (14% increase) (see Chapter 9, Impact WQ-5: *Effects on Electrical Conductivity*  
27 *Resulting from Facility Operations and Maintenance*); however, these increases are not expected to  
28 adversely affect beneficial uses or contribute to impairment and would thus not be expected to  
29 change the acreage of brackish marsh supporting salt marsh harvest mouse in the study area. This  
30 habitat persists in an environment that experiences natural fluctuations in salinity from tidal ebb  
31 and flow. Reduced diversions from the south Delta channels would not create a reduction in this  
32 habitat either.

##### 33 Maintenance

34 The maintenance of all project alternatives would not result in impacts on salt marsh harvest mouse  
35 because of the distance of modeled and known occupied habitat from the infrastructure.

1        ***CEQA Conclusion—All Project Alternatives***

2        All project alternatives would result in no impact on salt marsh harvest mouse because no modeled  
3        or known habitat for this species occurs in the vicinity of project construction, operations, or  
4        maintenance areas.

5        ***Mitigation Impacts***

6        As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
7        mitigation measure impacts. The analyses below consider the potential impacts associated with  
8        implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
9        Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
10       *Measures*.

11       *Compensatory Mitigation*

12       The implementation of the CMP would not result in impacts on salt marsh harvest mouse or benefits  
13       to the species because Bouldin Island and the I-5 ponds, the locations of where tidal wetland habitat  
14       restoration and channel margin enhancement, non-bank locations, and site protection instruments  
15       could occur, are outside of the known range of the species (Appendix 3F, Section 3F.4.3.4.2).

16       The project with the CMP would result in no impacts on salt marsh harvest mouse.

17       *Other Mitigation Measures*

18       Other mitigation measures proposed would not have impacts on salt marsh harvest mouse because  
19       no modeled or known habitat for this species occurs in the vicinity of project construction areas;  
20       modeled habitat for salt marsh harvest mouse depicted in Figure 13B.104-1 is more than 9 miles  
21       from the nearest project infrastructure (i.e., the park-and-ride lot on SR 12), which is approximately  
22       10 miles from the nearest CNDDDB record (California Department of Fish and Wildlife 2020a).

23       Overall, the construction of compensatory mitigation and implementation of other mitigation  
24       measures combined with project alternatives would have no impact on salt marsh harvest mouse.

25       **Impact BIO-50: Impacts of the Project on Riparian Brush Rabbit**

26       The methods for the analysis of effects on special-status species appear in Section 13.3.1.1 and  
27       information on the species life history and habitat suitability model for riparian brush rabbit are  
28       presented in the species account in Appendix 13B, Section 13B.105, *Riparian Brush Rabbit*.

29       ***All Project Alternatives***

30       *Construction*

31       The construction of the project alternatives, including field investigations, would not affect riparian  
32       brush rabbit (Table 13-98). The modeled habitat for riparian brush rabbit depicted in Figure  
33       13B.105-1 is approximately 4.5 miles southeast of the nearest project infrastructure (road  
34       improvements north of SR 4), which is approximately 10 miles from the nearest CNDDDB record  
35       (California Department of Fish and Wildlife 2020a).

1 **Table 13-98. Impacts on Modeled Habitat for Riparian Brush Rabbit by Alternative**

Alternative	Permanent Impacts (acres) <sup>a</sup>	Temporary Impacts (acres)	Total (acres)
All alternatives	0.00	0.00	0.00

2 <sup>a</sup> Permanent impacts presented in this table include both permanent and long-term temporary impact acreages; see  
3 discussion in Section 13.3.1.2.  
4

5 Operations

6 The operations of all project alternatives would not result in impacts on riparian brush rabbit.  
7 because of the distance of modeled and known occupied habitat from the infrastructure and because  
8 any changes to Delta flows and water quality would not likely affect the species or its habitat.

9 Maintenance

10 The maintenance of all project alternatives would not result in impacts on riparian brush rabbit  
11 because of the distance of modeled and known occupied habitat from the infrastructure.

12 **CEQA Conclusion—All Project Alternatives**

13 All project alternatives would result in no impact on riparian brush rabbit because no modeled or  
14 known habitat for this species occurs in the vicinity of project construction, operations, or  
15 maintenance areas.

16 **Mitigation Impacts**

17 Compensatory Mitigation

18 The implementation of the CMP would not result in impacts on riparian brush rabbit because  
19 Bouldin Island and the I-5 ponds, the locations of where tidal wetland habitat restoration and  
20 channel margin enhancement could occur are outside of the known range of the species (Appendix  
21 3F, Section 3F.4.3.4.2).

22 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
23 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
24 vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located, which  
25 generally do not provide habitat for riparian brush rabbit. Site-specific analyses are not provided  
26 because locations of potential non-bank sites are not currently known.

27 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
28 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
29 management of agricultural areas but may also include natural communities in the study area  
30 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
31 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
32 *CMP-19b: Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
33 *CMP-22b: Tricolored Blackbird Foraging Habitat*). Protected areas could contain habitat for riparian  
34 brush rabbit if they are within the range of the species; however, these habitats would be managed  
35 like easements for agricultural areas where farming activities are ongoing and would continue for  
36 the benefit of target species (e.g., growing alfalfa and managing for Swainson's hawk).

37 The project with the CMP would result in no impacts on riparian brush rabbit.



1 temporary impacts would occur as a result of road construction. Under the Bethany Reservoir  
 2 alignment (Alternative 5), permanent impacts and long-term temporary impacts would be primarily  
 3 due to deposition of material at an RTM storage area and construction of shafts at all tunnel shafts  
 4 except for the one on New Hope Tract and temporary impacts would result from road construction  
 5 (Appendix 13C). The central alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would result in  
 6 greater impacts on aquatic resources than the eastern alignment alternatives (Alternatives 3, 4a, 4b,  
 7 and 4c) and the Bethany Reservoir alignment alternative (Alternative 5), largely as a consequence of  
 8 levee improvements and access road improvements on Bouldin Island. Alternative 5 would result in  
 9 substantially fewer impacts because the alternative would not require the construction of a new  
 10 forebay.

11 **Table 13-99. Estimated Discharge of Dredged or Fill Material into Aquatic Resources Associated with**  
 12 **the Construction of Project Facilities (acres <sup>a</sup>)**

	Alt. 1	Alt. 2a	Alt. 2b	Alt. 2c	Alt. 3	Alt. 4a	Alt. 4b	Alt. 4c	Alt. 5
<b>Wetlands</b>									
Alkaline Wetland <sup>b</sup>	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	0.98
Seasonal Wetland	59.13	59.13	59.11	59.13	30.54	30.54	30.53	30.54	5.00
Vernal Pool	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20
Forested Wetland	4.02	3.86	3.56	3.87	3.06	3.10	2.80	3.10	3.23
Scrub Shrub Wetland	4.45	4.97	4.39	4.46	1.53	2.04	1.47	1.53	2.21
Freshwater Emergent Wetland	10.67	10.44	9.92	10.44	1.25	1.25	0.73	1.25	1.32
Wetlands Subtotal	84.57	84.70	83.28	84.20	42.68	43.23	41.83	42.72	12.94
<b>Other Waters</b>									
Agricultural Ditch	86.04	87.50	82.16	85.12	81.96	84.81	77.09	80.22	35.22
Conveyance Channel	22.42	34.00	22.42	22.42	22.42	34.00	22.42	22.42	0.40
Tidal Channel	31.88	33.07	28.03	30.63	20.56	22.25	17.20	19.81	10.74
Natural Channel	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.25
Depression	0.83	1.21	0.55	0.73	0.65	1.03	0.37	0.55	1.43
Other Waters Subtotal	141.76	156.37	133.75	139.49	126.18	142.68	117.67	123.59	48.04
Total	226.33	241.07	217.03	223.69	168.86	185.91	159.50	166.31	60.98

13 <sup>a</sup> Acres include permanent, long-term temporary, and temporary impacts.

14 <sup>b</sup> The alkaline wetland acreage includes alkaline wetlands that fall within vernal pool complexes. As explained in Section  
 15 13.1.2.1, *Vernal Pool Complex*, the southwestern portion of the delineation study area near Clifton Court Forebay consists  
 16 of a mosaic of vernal pools, alkaline seasonal wetlands, and grasslands that fall within vernal pool complexes mapped by  
 17 Witham et al. (2014); therefore, some of these wetlands fall under the vernal pool complex natural community.  
 18

19 Construction-related grading, excavation, work area silt fencing, and material staging areas could  
 20 result in permanent, long-term temporary, and temporary impacts on aquatic resources through  
 21 hydrological changes. The construction of facilities could permanently alter the topography or  
 22 subsurface conditions, and, thus, the supporting hydrology of nearby aquatic resources, resulting in  
 23 changes in the natural hydroperiods, which could alter the size and condition of aquatic resources.  
 24 Activities that may occur within construction work areas, such as the installation of silt fences,  
 25 excavation of temporary borrow areas, and stockpiling of construction materials and spoils could  
 26 also temporarily alter surface and subsurface hydrology of aquatic resources in the vicinity of work  
 27 areas.

1 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-4a: *Develop and*  
2 *Implement Erosion and Sediment Control Plan*; EC-4b: *Develop and Implement Storm Water Pollution*  
3 *Prevention Plan*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
4 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
5 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce  
6 potential impacts. The reduction would be achieved by (1) training construction staff regarding  
7 steps necessary to protect aquatic resources and the ramifications of non-compliance regarding the  
8 implementation of these protective measures; (2) implementing hazardous materials, spill  
9 prevention, erosion, sediment, and stormwater pollution plans to ensure that construction sites do  
10 not create conditions that would allow the transport of hazardous materials, sediment, and other  
11 materials into wetlands and other waters or alter the hydrology of these features; and (3) having a  
12 biological monitor present to ensure that non-disturbance buffers and associated construction  
13 fencing are intact and all other protective measures are being implemented, where applicable.

14 Field investigations for each alternative would be conducted prior to and during construction and  
15 would involve a variety of ground-disturbing activities (Section 3.15, *Field Investigations*), which  
16 could result in direct impacts on aquatic resources. Geotechnical investigations of areas in which  
17 tunnels would be constructed, including the West Tracy Fault, and which include test trenches,  
18 CPTs, and soil borings, would result in temporary impacts on aquatic resources. These impacts are  
19 included in the impact totals in Table 13-99. Specific impacts that would occur in the West Tracy  
20 Fault Study area and over the tunnel alignment footprints are set out in Appendix 13C. Field  
21 investigations within proposed surface construction footprints (including portions of tunnel  
22 alignments), which include test trenches, CPTs, soil borings, ERT, groundwater testing and  
23 monitoring, monument installation, pilot studies for settlement, agronomic testing, and utility  
24 potholing, would temporarily affect aquatic resources. These temporary impacts are not  
25 characterized as an additional discharge of dredged or fill material because impacts for these  
26 locations have already been quantified within the construction footprints. Environmental  
27 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
28 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
29 *Countermeasure Plans*; EC-4a: *Develop and Implement Erosion and Sediment Control Plans*; EC-4b:  
30 *Develop and Implement Stormwater Pollution Prevention Plans*; and EC-14: *Construction Best*  
31 *Management Practices for Biological Resources* (Appendix 3B) would reduce potential impacts by  
32 training construction staff on protecting aquatic resources, and the ramifications for not following  
33 protective measures; implementing hazardous material, spill prevention, erosion, sediment, and  
34 stormwater pollution plans to ensure that construction sites do not result in the transport of  
35 sediment and other materials into wetlands and waters or alter the hydrology of these features; by  
36 having a biological monitor present to ensure that non-disturbance buffers and associated  
37 construction fencing are intact and all other protective measures are being implemented where  
38 applicable, and to the extent practicable geotechnical investigations over tunnel alignments would  
39 avoid wetlands and waters, except for overwater borings planned in tidal channels.

1        Operations

2        Project operations of aboveground water conveyance facilities are not anticipated to result in any  
3        discharge of fill material into jurisdictional aquatic resources. The effects of operations on surface  
4        waters are addressed in Chapter 5, *Surface Water*, and effects of operations on water quality are  
5        addressed in Chapter 9.

6        Maintenance

7        The maintenance of water conveyance facilities for all project alternatives could result in the  
8        periodic temporary disturbance of jurisdictional aquatic resources. No permanent loss or discharge  
9        of dredged or fill material would result from these activities. Maintenance activities across all  
10       facilities that could affect aquatic resources include repaving of access roads every 15 years and  
11       semiannual general and ground maintenance (e.g., mowing, vegetation trimming, herbicide  
12       application) if these activities occur within or adjacent to aquatic resources. Maintenance at the  
13       Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) would include annual embankment  
14       repair, which could also result in the periodic disturbance of jurisdictional aquatic resources.

15       **CEQA Conclusion—All Project Alternatives**

16       The construction and maintenance of all project alternatives would result in the permanent and  
17       temporary discharge of dredged or fill material into jurisdictional aquatic resources and potentially  
18       cause permanent and temporary impacts on hydrologic conditions associated with aquatic  
19       resources.

20       The discharge of fill material and impacts on the hydrology of jurisdictional aquatic resources would  
21       be avoided and minimized by Environmental Commitments EC-1: *Conduct Worker Awareness*  
22       *Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and*  
23       *Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-4a: *Develop and Implement*  
24       *Erosion and Sediment Control Plans*; EC-4b: *Develop and Implement Stormwater Pollution Prevention*  
25       *Plans*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B).  
26       However, even with these commitments, the direct removal, filling, and hydrological interruption  
27       caused by project construction and maintenance would result in a substantial adverse effect on  
28       aquatic resources. Consequently, permanent and temporary impacts on jurisdictional aquatic  
29       resources associated with each of the project alternatives would be significant.

30       The CMP, which includes creation and enhancement of aquatic resources at mitigation banks and  
31       Bouldin Island and the I-5 ponds, would ensure that there would be no net loss in the overall  
32       abundance, diversity, and condition of aquatic resources within the study area (Appendix 3F,  
33       Section 3F.3.2, *Approach to Aquatic Resources Mitigation*), which would mitigate for the impacts  
34       associated with the construction-related discharge of fill material into aquatic resources to less than  
35       significant. Mitigation Measure BIO-2b: *Avoid and Minimize Impacts on Terrestrial Biological*  
36       *Resources from Maintenance Activities* would be required to avoid and minimize the potential for  
37       periodic, temporary discharges of fill material into aquatic resources during maintenance activities.  
38       The impact of discharge of fill into aquatic resources would be reduced to less than significant  
39       because the aforementioned measures would avoid a net loss in aquatic resources and avoid and  
40       minimize periodic, temporary discharges of fill material into aquatic resources by assessing  
41       maintenance work areas for aquatic resources, establishing non-disturbance buffers around aquatic  
42       resources, training maintenance staff on the need to avoid the discharge of fill material into aquatic  
43       resources, and having a biological monitor present, where applicable.



## 1 **Mitigation Measure CMP: Compensatory Mitigation Plan**

2 DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP), which  
3 would ensure no net loss, in the overall abundance, diversity, and condition of aquatic resources  
4 within the study area through the creation and protection of aquatic resources on Bouldin  
5 Island, the purchase of mitigation credits for vernal pools and alkaline wetlands at an agency-  
6 approved mitigation bank, and through tidal marsh and channel margin mitigation either  
7 through restoration in the study area or through the purchase of mitigation credits at an agency-  
8 approved mitigation bank (Appendix 3F, Section 3F.3.2).

## 9 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological** 10 **Resources from Maintenance Activities**

11 See description of Mitigation Measure BIO-2b under Impact BIO-2.

### 12 ***Mitigation Impacts***

13 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
14 mitigation measure impacts. The analyses below consider the potential impacts associated with  
15 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
16 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
17 *Measures*.

### 18 ***Compensatory Mitigation Impacts***

19 The creation and enhancement of aquatic resources, as well as habitat for special-status species,  
20 under the CMP (Appendix 3F) on Bouldin Island and at the I-5 ponds would result in the permanent  
21 and temporary discharges of fill material into existing jurisdictional aquatic resources (Appendix  
22 13C) and the permanent and temporary alteration of hydrology from grading to create the  
23 appropriate topography and soil conditions to establish and enhance habitats.

24 The CMP also includes a framework for channel margin enhancement and tidal wetland habitat  
25 creation. The activities to enhance channel margins would generally include removal of existing  
26 riprap, modification of the existing channel margin with heavy equipment, and placement of large  
27 woody debris on the channel margin, which would result in the permanent and temporary discharge  
28 of fill material into aquatic resources. Channel margin enhancement sites would be targeted within  
29 the same general geography of the project, including the north Delta along the Sacramento River  
30 mainstem, north Delta along Sacramento River tributaries (e.g., Steamboat, Sutter, and Elk Sloughs),  
31 lower Yolo Bypass, and Cache Slough Complex. Tidal restoration activities would include grading,  
32 creating setback levees, planting, and breaching of existing levees, which would result in the  
33 permanent and temporary discharge of fill material into aquatic resources and permanent changes  
34 to hydrological conditions. Potential areas for tidal restoration would be within the lower Yolo  
35 Bypass and Cache Slough Complex.

36 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
37 enhancement (Appendix 3F, Section 3F.3.2.4), these activities could result in the temporary  
38 discharge of fill into aquatic resources enhanced or created adjacent to existing aquatic resources.  
39 Site-specific analyses are not provided because locations of potential non-bank sites are not  
40 currently known.

1 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
2 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
3 management of agricultural areas but may also include natural communities in the study area  
4 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
5 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
6 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
7 CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas may contain aquatic resource and  
8 management activities in agricultural areas could result in the temporary discharge of fill into these  
9 resources. Site-specific analyses are not provided because locations of potential protection  
10 instruments are not currently known.

11 As stated in Appendix 3F, Section 3F.4, *Mitigation Work Plan*, the compensatory mitigation actions at  
12 Bouldin Island would be designed to provide compensatory mitigation for aquatic resources under  
13 both federal and state mitigation standards and ensures a net gain in aquatic resources, accounting  
14 for any conversions of existing aquatic resources (e.g., agricultural ditches converted to freshwater  
15 emergent wetland). Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-3:  
16 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-4a: *Develop and*  
17 *Implement Erosion and Sediment Control Plans*; EC-4b: *Develop and Implement Stormwater Pollution*  
18 *Prevention Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
19 (Appendix 3B) would reduce the potential temporary impact on aquatic resources by training  
20 construction staff on protecting aquatic resources and the ramifications for not following protective  
21 measures; implementing spill prevention, erosion, sediment, and stormwater pollution plans to  
22 ensure that grading for sites do not result in the transport of sediment and other materials into  
23 adjacent aquatic resources; and by having a biological monitor present to ensure that non-  
24 disturbance buffers and associated construction fencing are intact and all other protective measures  
25 are being implemented where applicable.

26 The impact on aquatic resources from the project alternatives with the CMP would be less than  
27 significant with mitigation.

### 28 Other Mitigation Measures

29 Some other mitigation measures may affect wetlands and other waters. Impacts may be caused by  
30 activities such as grading, excavations, dredging, construction of structures, placement and salvage  
31 of top soils, plantings, irrigation system installation, and construction of swales. Impacts of these  
32 measures may include hydrological changes, altered drainage patterns, sedimentation, and  
33 excavation and would be similar to construction effects of the project alternatives on wetland and  
34 waters.

35 These impacts would be reduced through the CMP; Environmental Commitments EC-1: *Conduct*  
36 *Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*;  
37 EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-4a:  
38 *Develop and Implement Erosion and Sediment Control Plans*; EC-4b: *Develop and Implement*  
39 *Stormwater Pollution Prevention Plans*; and EC-14: *Construction Best Management Practices for*  
40 *Biological Resources*; and Mitigation Measure BIO-2b: *Avoid and Minimize Impacts on Terrestrial*  
41 *Biological Resources from Maintenance Activities*. Therefore, impacts on wetlands and other waters  
42 from other mitigation measures would be reduced to less than significant.

1 Overall, the impacts on wetlands and other waters from construction of compensatory mitigation  
 2 and implementation of other mitigation measures, combined with project alternatives, would not  
 3 change the impact conclusion of less than significant with mitigation.

#### 4 **Impact BIO-52: Impacts of Invasive Species Resulting from Project Construction and** 5 **Operations on Established Vegetation**

##### 6 *All Project Alternatives*

##### 7 Construction

8 Constructing the water conveyance facilities would remove established vegetation, which could  
 9 create opportunities for the introduction and spread of invasive and noxious plant species into the  
 10 study area. As noted in Section 13.1.5.3, invasive species are currently present in all of the natural  
 11 communities and agricultural areas in the study area. Also, work conducted in aquatic habitat has  
 12 the potential to result in the introduction and spread of aquatic invasive plant species. These  
 13 opportunities would be directly proportional to the level of disturbance associated with project  
 14 construction. With permanent disturbance, no habitat would remain that would be subject to  
 15 substantial invasion. With temporary disturbance, minimal invasion would be expected, because the  
 16 sites would be restored within 1 year. Areas with long-term disturbance would provide the greatest  
 17 opportunities for invasion. The magnitude of long-term temporary natural community disturbance  
 18 would be similar under all project alternatives, although the amount of disturbance would vary by  
 19 alternative, with the greatest amount of disturbance associated with Alternative 4a and the least  
 20 amount of disturbance associated with Alternative 2b (Table 13-100). About 90% of the disturbance  
 21 would be associated with agricultural or developed lands, but substantial disturbance would also  
 22 occur in grassland, wetland, and riparian natural communities. Environmental Commitment EC-14:  
 23 *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce the  
 24 potential for the introduction and spread of invasive plants by restoring temporarily disturbed  
 25 areas, reseeding areas with noninvasive species, and ensuring equipment is cleaned and inspected  
 26 before entering new areas.

27 **Table 13-100. Summary of Temporary Disturbance in Natural Communities under All Alternatives from**  
 28 **Invasive Plant Species (long-term temporary impact acres)**

Natural Community	Alt. 1	Alt. 2a	Alt. 2b	Alt. 2c	Alt. 3	Alt. 4a	Alt. 4b	Alt. 4c	Alt. 5
Agricultural	830.16	968.84	675.08	825.56	971.07	1,005.99	807.60	952.70	937.10
Alkali Seasonal Wetland Complex	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.00
Grassland	16.15	35.18	15.60	16.29	15.98	35.01	15.44	16.13	9.66
Nontidal Brackish Emergent Wetland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nontidal Freshwater Perennial Emergent Wetland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nontidal Perennial Aquatic	0.29	0.29	0.10	0.19	0.29	0.29	0.10	0.19	0.83
Other Seasonal Wetlands	0.92	0.92	0.92	0.92	0.00	0.00	0.00	0.00	0.00
Tidal Brackish Emergent Wetland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tidal Freshwater Emergent Wetland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Natural Community	Alt. 1	Alt. 2a	Alt. 2b	Alt. 2c	Alt. 3	Alt. 4a	Alt. 4b	Alt. 4c	Alt. 5
Tidal Perennial Aquatic	4.73	8.42	4.28	4.68	4.73	8.42	4.28	4.65	1.10
Valley/Foothill Riparian	2.61	3.82	1.63	2.90	2.79	3.82	1.63	2.90	4.05
Vernal Pool Complex	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.61
Total	912.74	1,082.29	751.6	911.27	1,061.07	1,122.68	889.19	1,041.10	1,028.68

Alt. = Alternative.

Field investigations for all alternatives would be conducted prior to and during construction and would involve a variety of ground-disturbing activities (Section 3.15, *Field Investigations*), which could result in the spread of invasive plant species as equipment is move from place to place. Geotechnical investigations associated with the West Tracy Fault and the tunnels for all alternatives, which include test trenches, CPTs, and soil borings, would result in temporary impacts on agricultural and natural habitat that could result in the introduction of invasive plants. Field investigations within proposed surface construction footprints (including portions of tunnel alignments), which include test trenches, CPTs, soil borings, ERT, groundwater testing and monitoring, monument installation, pilot studies for settlement, agronomic testing, and utility potholing could result in the introduction of invasive plants. These temporary impacts are not characterized as an additional loss in habitat because impacts for these locations have already been quantified within the construction footprints. Environmental Commitment EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would reduce the potential for the introduction and spread of invasive plants by ensuring that equipment used is cleaned and inspected before entering new areas.

### Operations

Project operations would not disturb terrestrial natural communities nor create opportunities for invasion and spread of invasive plant species into terrestrial natural communities. Chapter 9, Impact WQ-7: *Effects on Nutrients Resulting from Facility Operations* assessed the potential for increased nutrients as a result of project operation and whether that could lead to an expansion of invasive aquatic macrophytes in the study area. This analysis determined that invasive aquatic macrophyte growth rates are not phosphorus- or nitrogen-limited in the Delta, because these nutrients are available in excess. Thus, potential minor increases or decreases in these nutrient concentrations that may occur at some locations and times within the Delta would have negligible, if any, effects on macrophyte growth in the Delta.

### Maintenance

Maintenance activities would take place in existing or developed facilities and would include management of invasive plants. Vegetation management would take place along the sedimentation basins, sediment drying lagoons, and Southern Forebay. Management actions would include removal of aboveground plants by mowing or trimming and would not include ground disturbance. Therefore, maintenance activities would not promote the invasion and spread of invasive plant species into terrestrial natural communities.

### **CEQA Conclusion—All Project Alternatives**

Constructing the project alternatives would result in the long-term and temporary disturbance of natural communities in the study area. This disturbance has the potential to facilitate the

1 introduction and spread of invasive plant species into natural communities, which could threaten  
2 the diversity or abundance of native plant and wildlife species in the study area. However,  
3 Environmental Commitments EC-4a: *Develop and Implement Erosion and Sediment Control Plans* and  
4 EC-14: *Construction Best Management Practices for Biological Resources* would reduce the potential  
5 for the introduction and spread of invasive plants and avoid or minimize the potential effects on  
6 natural communities and special-status species by restoring temporarily disturbed areas, reseeding  
7 areas with noninvasive species, and ensuring equipment is cleaned and inspected before entering  
8 new areas. Therefore, this impact would be less than significant.

### 9 ***Mitigation Impacts***

10 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
11 mitigation measure impacts. The analyses below consider the potential impacts associated with  
12 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
13 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
14 *Measures*.

### 15 *Compensatory Mitigation*

16 The creation and enhancement of wetlands and other waters, as well as habitat for special-status  
17 species on Bouldin Island and at the I-5 ponds, potential locations of tidal restoration and channel  
18 margin enhancement, and potential non-bank sites under the project CMP, could result in the spread  
19 of invasive plant species from equipment used to grade and excavate areas for restoration.

20 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
21 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
22 management of agricultural areas but may also include natural communities in the study area  
23 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
24 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
25 CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
26 CMP-22b: *Tricolored Blackbird Foraging Habitat*). Protected and managed areas would not result in  
27 an increased risk of the spread of invasive plant species relative to baseline conditions because  
28 these areas will either continue as agricultural areas or be protected as natural habitat.

29 Environmental Commitment EC-14: *Construction Best Management Practices for Biological Resources*  
30 (Appendix 3B) would reduce the potential for the spread of invasive plant species by requiring the  
31 cleaning and inspecting equipment used for grading and excavation. In addition, the CMP's long-  
32 term management plan (Section 3F.6.3) includes mapping and control of invasive species, as do the  
33 site-specific maintenance and management plans (Section 3F.7.1) and monitoring and adaptive  
34 management plan (Section 3F.7.2).

35 The impact from the potential spread of invasive plant species from the project alternatives with the  
36 CMP would be less than significant.

### 37 *Other Mitigation Measures*

38 Some other mitigation measures could result in the spread of invasive plant species. Impacts may be  
39 caused by activities such as vegetation removal, ground disturbance including grading, excavations,  
40 and dredging. Impacts of these measures may include the spread of invasive plant species through  
41 equipment used for grading and excavation to disturbed sites.

1 These impacts would be reduced through the CMP and Environmental Commitment EC-14:  
2 *Construction Best Management Practices for Biological Resources*, which would reduce the potential  
3 for the introduction and spread of invasive plants by restoring temporarily disturbed areas,  
4 reseeding areas with noninvasive species, and ensuring that equipment is cleaned and inspected  
5 before entering new areas. Therefore, impacts of spreading of invasive plant species from other  
6 mitigation measures would be reduced to less than significant.

7 Overall, the impacts of spreading of invasive plant species from construction of compensatory  
8 mitigation and implementation of other mitigation measures, combined with project alternatives,  
9 would not change the impact conclusion of less than significant.

### 10 **Impact BIO-53: Interfere Substantially with the Movement of Any Native Resident or** 11 **Migratory Fish or Wildlife Species or with Established Native Resident or Migratory Wildlife** 12 **Corridors, or Impede the Use of Native Wildlife Nursery Sites**

13 The analysis presented below focuses on terrestrial wildlife connectivity and movement. Fish  
14 movement is presented in Chapter 12, *Fish and Aquatic Resources*. An analysis of wildlife nursery  
15 sites is limited to potential impacts on rookeries, which is discussed in Impact BIO-35: *Impacts of the*  
16 *Project on Cormorants, Herons, and Egrets*. The analysis presented below includes connectivity-  
17 related impacts on terrestrial wildlife species, which includes common as well as special-status  
18 species; however, the specific impact analyses on terrestrial special-status species are presented in  
19 Impacts BIO-14 through BIO-50.

20 The methods for the analysis of effects on wildlife movement, connectivity, and corridors appear in  
21 Section 13.3.1.1.

### 22 ***All Project Alternatives***

#### 23 *Construction*

24 The construction of all of the alternatives would result in permanent and temporary impacts on  
25 terrestrial wildlife connectivity and existing connectivity resources (see Section 13.1.6 for a  
26 complete list of existing connectivity resources), including potential indirect effects on habitat and  
27 species movement. These impacts would occur as a result of construction of access roads, rail lines,  
28 forebays, intake structures, levee improvements, outlet and control structures, park-and-ride  
29 facilities, transmission lines, switching stations, RTM areas, and tunnel shafts. Construction-related  
30 grading, excavation, vegetation removal and habitat modifications (e.g., loss of vegetative structure,  
31 contiguity, cover, or canopy) would result in the permanent and temporary loss of or alteration of  
32 habitat and associated connectivity function or create new wildlife movement barriers. Construction  
33 noise and disturbances from increased human presence and lighting during night work could  
34 disrupt species movement and habitat selection, habitat access, and wildlife behavior potentially,  
35 resulting in impacts on wildlife connectivity. Species affected by construction impacts include a wide  
36 variety of mammals, birds, reptiles, amphibians, and invertebrates inhabiting the study area and  
37 includes all of the WCGs included in this evaluation (i.e., low-mobility small fauna, semi-aquatic  
38 obligate, moderate-mobility small fauna, adaptive high-mobility fauna, high-openness, high-mobility  
39 carnivores, adaptive ungulates, very high-openness fauna, and aerial fauna). See Section 13.1.1 for a  
40 full description and summary of WCGs used in this analysis. Table 13-101 provides a summary of  
41 terrestrial wildlife species occurring in study area with potential movement/connectivity impacts.  
42 These potential impacts would be reduced by Environmental Commitments EC-1: *Conduct Worker*

1 *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
 2 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-4a: *Develop and*  
 3 *Implement Erosion and Sediment Control Plans*; EC-4b: *Develop and Implement Stormwater Pollution*  
 4 *Prevention Plans*; EC-11: *Fugitive Dust Control*; EC-12: *On-Site Concrete Batching Plants*; and EC-14:  
 5 *Construction Best Management Practices for Biological Resources*. These measures would avoid and  
 6 minimize habitat and species impacts that could cause potential for injury, mortality, disruption of  
 7 normal behaviors, and disturbances to habitat that potentially may disrupt species movement,  
 8 habitat selection, habitat access, and wildlife behavior, resulting in impacts on wildlife connectivity,  
 9 by training construction staff on protecting habitat and species, reporting requirements, and the  
 10 ramifications for not following these measures; implementing spill prevention and containment  
 11 plans that would avoid material spills that could affect habitat and wildlife; preventing erosion and  
 12 sedimentation of habitats and stormwater pollution that may affect habitat and wildlife; preventing  
 13 dust emissions that may affect habitat and wildlife; implementing construction BMPs and having a  
 14 biological monitor present to ensure that non-disturbance buffers and associated construction  
 15 fencing are intact and all other protective measures are being implemented where applicable to  
 16 protect habitat and wildlife.

17 Table 13-101 provides a summary of WCGs and associated terrestrial wildlife species occurring in  
 18 the study area with potential movement/connectivity impacts. General discussions of impacts on  
 19 existing terrestrial wildlife connectivity associated with construction for each alternative are  
 20 discussed below and a more detailed discussion of impacts on all identified existing connectivity  
 21 resources for each alternative is provided in Appendix 13E, *Terrestrial Wildlife Connectivity*.

22 **Table 13-101. Summary of Terrestrial Wildlife Species Occurring in Study Area with Potential**  
 23 **Movement/Connectivity Impacts**

Wildlife Crossing Guild	Species Occurring in Study Area with Potential Movement/Connectivity Impacts
Low-mobility small fauna	Mammals: San Joaquin pocket mouse Reptiles and Amphibians: <u>California tiger salamander</u> , <i>western spadefoot toad</i> , <u>California red-legged frog</u> , <i>coast horned lizard</i> , <i>Northern California legless lizard</i> , <i>California glossy snake</i> , <i>San Joaquin coachwhip</i> Invertebrates: <u>Valley elderberry longhorn beetle</u>
Semi-Aquatic Obligate	Mammals: River otter, mink, beaver Reptiles and Amphibians: <u>Giant garter snake</u> , <i>western pond turtle</i>
Moderate-mobility small fauna	Mammals: <i>American badger</i> , squirrels, raccoon, weasels
Adaptive high-mobility fauna	Mammals: Bobcat, coyote
High-openness, high-mobility carnivores	Mammals: <u>Mountain lion</u>
Adaptive ungulates	Mammals: Mule deer
Very high-openness fauna	Mammals: <u>San Joaquin kit fox</u>

Wildlife Crossing Guild	Species Occurring in Study Area with Potential Movement/Connectivity Impacts
Aerial fauna	<p>Mammals (bats): <i>pallid bat</i>, <i>Townsend's big-eared bat</i>, big brown bat, silver-haired bat, <i>western red bat</i>, hoary bat, California myotis, little brown bat, western small footed myotis, Yuma myotis, western pipistrelle, <i>western mastiff bat</i>, Mexican free-tailed bat</p> <p>Birds: <b>California black rail</b>, <b>Swainson's hawk</b>, <b>tricolored blackbird</b>, <b>golden eagle</b>, ferruginous hawk, <i>Northern harrier</i>, <i>short-eared owl</i>, <i>Modesto song sparrow</i>, osprey, <b>white-tailed kite</b>, Cooper's hawk, cormorants, herons, egrets, <i>burrowing owl</i>, <i>yellow-headed blackbird</i>, <i>grasshopper sparrow</i>, <i>yellow-breasted chat</i>, <i>loggerhead shrike</i>, <i>least bittern</i></p>

Note: Species in underline are state or federally listed/candidates; species in **bold** are California fully protected species; species in *italics* are Species of Special Concern.

1  
2  
3  
4 Intake facilities constructed under all alternatives would remove and fragment riparian habitat  
5 along the banks of the Sacramento River, creating movement barriers and potentially increasing  
6 wildlife road crossings and wildlife-vehicle collision risk as species attempt to navigate around the  
7 facilities; however, the degree of impact varies by the number of intakes used under the alternatives,  
8 with Alternatives 2b and 4b having a relatively smaller effect due to having only one intake and  
9 Alternatives 2a and 4a having the greatest effect due to having three intakes. WCG potentially  
10 affected include low-mobility small fauna, semi-aquatic obligates, moderate-mobility small fauna,  
11 adaptive high-mobility fauna, high-openness, high-mobility carnivores, adaptive ungulates, very  
12 high-openness fauna, and aerial fauna.

13 Access roads constructed under all alternatives would result in loss of habitat (from new roads and  
14 intersections and roadway widenings), increase traffic volumes, cause habitat fragmentation, create  
15 potential movement barriers, and potentially result in increased wildlife mortality from vehicle  
16 collisions. All WCGs have potential to be affected. The new intersection for Byron Highway and the  
17 extension of Armstrong Road for central and eastern alignment alternatives (Alternatives 1, 2a, 2b,  
18 2c, 3, 4a, 4b, and 4c) would create new upland, wetland, and stream habitat fragmentation  
19 (e.g., Brushy Creek), barriers to wildlife movement, and sources of wildlife mortality from increased  
20 risk of vehicle collisions with WCGs, including low-mobility small fauna, semi-aquatic obligates,  
21 moderate-mobility small fauna, adaptive high-mobility fauna, high-openness, high-mobility  
22 carnivores, adaptive ungulates, very high-openness fauna, and aerial fauna.

23 Access roads servicing facilities on Bouldin Island for the central alignment alternatives  
24 (Alternatives 1, 2a, 2b, and 2c) would cross a culvert on SR 12 that has been identified by CDFW  
25 (2020d:11) as a priority barrier to wildlife movement in the region, defined as a barrier to wildlife  
26 movement that is high priority for remediation. Widening the road above this culvert would reduce  
27 the culvert openness and worsen this culvert as a wildlife movement barrier and increase the risk of  
28 vehicle collisions with WCGs, including low-mobility small fauna, semi-aquatic obligates, moderate-  
29 mobility small fauna, adaptive high-mobility fauna, high-openness, high-mobility carnivores,  
30 adaptive ungulates, very high-openness fauna, and aerial fauna.

31 A new interchange on Bouldin Island for the central alignment alternatives (Alternatives 1, 2a, 2b,  
32 and 2c) would create new habitat fragmentation and sources of wildlife mortality from vehicle  
33 collisions. WCGs potentially affected include low-mobility small fauna, semi-aquatic obligates,  
34 moderate-mobility small fauna, adaptive high-mobility fauna, high-openness, high-mobility  
35 carnivores, adaptive ungulates, very high-openness fauna, and aerial fauna.



1 On roads with traffic volumes below 2,500 annual average daily traffic (ADT) volume, the wildlife  
2 movement/connectivity barrier effects may be generally low and can also be associated with lower  
3 risk of wildlife-vehicle collisions, although depending on road conditions, traffic speeds,  
4 WCG/species under consideration, and other factors, the risk of barrier effects and wildlife-vehicle  
5 collisions may still be high, even at much lower traffic volumes (Jacobson et al. 2016:4, 6, 8-10;  
6 Clevenger and Huijser 2011:14-17). Further, any increase in traffic volume may result in an  
7 increased risk of wildlife-vehicle collisions or wildlife movement barrier risks (Jacobson et al.  
8 2016:4-6, 8). For the purposes of this assessment, 2,500 ADT will be used to differentiate low versus  
9 high baseline traffic volumes. Existing roads with greater than 2,500 existing ADT across all of the  
10 alternatives include I-5, I-205, SR 12, SR 4, Byron Highway, Twin Cities Road, West Peltier Road,  
11 Tracy Boulevard, and Walnut Grove Road (Chapter 24, Section 24.3.3.2, *Impacts of the Project*  
12 *Alternatives Related to Noise and Vibration*). Proposed project ADT on these roads across all of the  
13 alternatives would have increases ranging between 70 and 600 ADT in each direction (Chapter 24,  
14 Section 24.3.3.2). On existing roads with less than 2,500 ADT across all alternatives, the proposed  
15 project construction ADT is not expected to increase above 2,500, the existing ranges are 27 to 1,000  
16 ADT and increases would range between 70 and 600 ADT across all alternatives (Chapter 24,  
17 Section 24.3.3.2). In general, any increased ADT can increase wildlife-vehicle collision and wildlife  
18 movement barrier risks, although none of the proposed/projected construction increases in ADT are  
19 expected to result in substantial increased risks to wildlife movement, connectivity, or mortality.  
20 WCGs potentially affected include low-mobility small fauna, semi-aquatic obligates, moderate-  
21 mobility small fauna, adaptive high-mobility fauna, high-openness, high-mobility carnivores,  
22 adaptive ungulates, very high-openness fauna, and aerial fauna.

23 Rail spurs would be constructed to support the rail-served material depot at the Twin Cities  
24 Complex double launch shaft site, serve the Southern Complex tunnel launch shaft site, and  
25 transport RTM from the Twin Cities Complex to the Southern Complex under Alternatives 1, 2a, 2b,  
26 2c, 3, 4a, 4b, and 4c. A rail-served material depot would be constructed on Lower Roberts Island  
27 under Alternatives 3, 4a, 4b, 4c, and 5. It is assumed that up to three trains may use each of the new  
28 rail spurs per day, with each train consisting of an average of two locomotives and 50 rail cars. New  
29 rail spurs and associated increased rail traffic would result in potential habitat connectivity and  
30 wildlife movement barriers and increased wildlife mortality risk from train collisions. WCGs  
31 potentially affected include low-mobility small fauna, semi-aquatic obligates, moderate-mobility  
32 small fauna, adaptive high-mobility fauna, high-openness, high-mobility carnivores, adaptive  
33 ungulates, very high-openness fauna, and aerial fauna.

34 The Southern Forebay would be constructed to support the Southern Complex on Byron Tract for  
35 central and eastern alignment alternatives (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c). The forebay  
36 would remove and fragment habitat and create a potential movement barrier around Italian Slough.  
37 Wildlife would have to navigate around the facility or cross over rail and roads, thus increasing the  
38 potential for wildlife mortality from vehicle or rail collision. WCGs potentially affected include low-  
39 mobility small fauna, semi-aquatic obligates, moderate-mobility small fauna, adaptive high-mobility  
40 fauna, high-openness, high-mobility carnivores, adaptive ungulates, very high-openness fauna, and  
41 aerial fauna.

42 Levee improvement construction would occur under at Bouldin Island under Alternatives 1, 2a, 2b,  
43 and 2c; at Lower Roberts Island at Turner Cut under Alternatives 3, 4a, 4b, 4c, and 5, and a ring levee  
44 would be constructed at the Twins Cities Complex under Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, 4c, and  
45 5. Levee modifications have the potential to temporarily and permanently remove and alter habitat,  
46 resulting in barriers to species movement and habitat access and reduced species movement

1 abilities. WCGs potentially affected include low-mobility small fauna, semi-aquatic obligates,  
2 moderate-mobility small fauna, adaptive high-mobility fauna, high-openness, high-mobility  
3 carnivores, adaptive ungulates, very high-openness fauna, and aerial fauna.

4 Transmission line and SCADA line construction would take place where existing lines do not support  
5 the projected load needs; new lines would be placed on existing infrastructure, to the extent  
6 possible. New aboveground transmission lines would be constructed for the Southern Complex  
7 under Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c and for the Bethany Complex under Alternative 5.  
8 New lines would not substantially alter the existing landscape. The potential for aerial strike with  
9 new transmission and SCADA line varies by wildlife species, level of exposure, and the species  
10 sensitivity. The potential for avian collision/electrocution risk is analyzed in Section 13.3.3.3,  
11 *Impacts of the Project Alternatives on Special-Status Wildlife Species*. WCGs potentially affected  
12 include aerial fauna.

13 Outlet and control structures, park-and-ride facilities, switching stations, RTM areas, and shaft  
14 facility construction would occur across all project alternatives. Such facilities would temporarily  
15 and permanently remove habitat, resulting in barriers to species movements and habitat access, and  
16 reduced species movement abilities. Such facilities may create wildlife movement barriers and  
17 potentially increase wildlife road crossings and wildlife-vehicle collision risk as species attempt to  
18 navigate around the facilities. WCGs potentially affected include low-mobility small fauna, semi-  
19 aquatic obligates, moderate-mobility small fauna, adaptive high-mobility fauna, high-openness, high-  
20 mobility carnivores, adaptive ungulates, very high-openness fauna, and aerial fauna.

21 Field investigations for all alternatives would be conducted prior to and during construction under  
22 all alternatives and would involve a variety of ground-disturbing activities (Section 3.15), some of  
23 which could result in impacts on habitat, existing wildlife connectivity resources, and wildlife  
24 movement. Geotechnical investigations associated with the West Tracy Fault and tunnels for all  
25 alternatives, which include test trenches, CPTs, and soil borings, would result in temporary impacts  
26 on habitat (Appendix 13C). Field investigations within proposed surface construction footprints  
27 (including portions of tunnel alignments), which include test trenches, CPTs, soil borings, ERT,  
28 groundwater testing and monitoring, monument installation, pilot studies for settlement, agronomic  
29 testing, and utility potholing, would temporarily affect habitats. These temporary impacts are not  
30 characterized as an additional loss of habitat because impacts for these locations have already been  
31 quantified within the construction footprints, but could still result in the disturbances and effects on  
32 wildlife movement and connectivity, as discussed above for facility construction. WCGs potentially  
33 affected include low-mobility small fauna, semi-aquatic obligates, moderate-mobility small fauna,  
34 adaptive high-mobility fauna, high-openness, high-mobility carnivores, adaptive ungulates, very  
35 high-openness fauna, and aerial fauna. Environmental Commitments EC-1: *Conduct Worker*  
36 *Awareness Training* and EC-14: *Construction Best Management Practices for Biological Resources*  
37 (Appendix 3B) would reduce these potential impacts by implementing worker awareness training,  
38 which would alert staff on the need to avoid disturbing wildlife and of the various measures that  
39 would avoid and minimize these disturbances; and establishing non-disturbance buffers using  
40 construction fencing, which would minimize wildlife disturbance, and the restoration of temporarily  
41 disturbed areas.

#### 42 Operations

43 All project alternatives have the potential for impacts on wildlife connectivity resources and wildlife  
44 movement from operations at project facilities, which includes impacts associated with new access

1 roads, increased vehicle traffic volumes on access roads, potential increased night vehicle traffic  
2 volumes, increased human presence, and permanent project lighting. Lighting at facilities associated  
3 with the Southern Complex on Byron Tract and west of Byron Highway (Alternatives 1, 2a, 2b, 2c, 3,  
4 4a, 4b, and 4c) and the Bethany Complex (Alternative 5) could disrupt wildlife movement if lighting  
5 at these facilities spills over into adjacent habitats. However, as stated in Chapter 3, Section 3.4.12,  
6 *Fencing and Lighting*, permanent lighting at project facilities would be motion activated, downcast,  
7 cut-off type fixtures with non-glare finishes, which would minimize the potential for this impact.  
8 Species affected by operations include a wide variety of mammals, birds, reptiles, amphibians, and  
9 invertebrates inhabiting the study area. WCGs potentially affected include low-mobility small fauna,  
10 semi-aquatic obligates, moderate-mobility small fauna, adaptive high-mobility fauna, high-openness,  
11 high-mobility carnivores, adaptive ungulates, very high-openness fauna, and aerial fauna.

12 New aboveground high-voltage transmission lines would be constructed to power the Southern  
13 Complex under Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c, and the Bethany Complex under  
14 Alternative 5. The potential for collisions with new project lines varies by species and depends  
15 primarily on the species' level of exposure (i.e., proximity of the bird's habitat and resources to the  
16 transmission line) and its sensitivity (i.e., morphological and behavioral characteristics that  
17 influence the bird's propensity to collide with a line). Modeled habitat for special-status birds and  
18 natural communities that are suitable for nesting are present in the vicinity of proposed lines and  
19 therefore some potential for collision risk exists. Transmission line towers also provide perching  
20 substrate for raptors, which are predators of many special-status and non-special-status bird  
21 species. The existing network of transmission lines in the study area currently poses these risks, and  
22 any incremental risk associated with the new power line corridors would be expected to be low.  
23 WCGs potentially affected include low-mobility small fauna, semi-aquatic obligates, moderate-  
24 mobility small fauna, adaptive high-mobility fauna, high-openness, high-mobility carnivores,  
25 adaptive ungulates, very high-openness fauna, and aerial fauna.

## 26 Maintenance

27 The maintenance of facilities under all alternatives could result in impacts on wildlife connectivity  
28 resources. Maintenance for facilities under all alternatives would include annual embankment  
29 repair, quarterly animal burrow filling, quarterly weed management (e.g., mechanical removal and  
30 herbicide application), and semiannual general and ground maintenance (e.g., mowing, vegetation  
31 trimming), daily or weekly inspections by vehicle, and annual cleaning (pressure washing) and  
32 would also include repaving of access roads every 15 years. These maintenance activities could  
33 cause disturbances, vegetation cover loss, and habitat avoidance during these activities which could  
34 result in reduced or altered wildlife movement ability. Species affected by maintenance impacts  
35 include a wide variety of mammals, birds, reptiles, amphibians, and invertebrates inhabiting the  
36 study area. WCGs potentially affected include low-mobility small fauna, semi-aquatic obligates,  
37 moderate-mobility small fauna, adaptive high-mobility fauna, high-openness, high-mobility  
38 carnivores, adaptive ungulates, very high-openness fauna, and aerial fauna.

## 39 **CEQA Conclusion—All Project Alternatives**

40 Construction, operations, and maintenance of all project alternatives would result in impacts on  
41 wildlife connectivity resources and wildlife movement through the permanent and temporary loss  
42 of habitat, habitat fragmentation, new roads and railways, increased traffic volume, increased  
43 human presence and associated disturbances such as noise, light, increased vehicular and rail traffic,

1 increased transmission line collision risks, and the potential for injury, mortality, and the disruption  
2 of normal wildlife movement behaviors and habitat connectivity.

3 Although a variety of existing terrestrial wildlife connectivity resources would be affected, most  
4 would not be completely or substantially fragmented or affected. In a few locations, habitat  
5 fragmentation, wildlife movement barriers, increased risk of wildlife collisions and mortality, and  
6 disturbances that may alter or obstruct wildlife connectivity and movement would result in  
7 significant impacts under all alternatives.

8 The potential impacts on wildlife connectivity resources, habitat connectivity, and wildlife  
9 movement from project construction, operations, and maintenance would be reduced by  
10 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
11 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
12 *Containment, and Countermeasure Plans*; EC-4a: *Develop and Implement Erosion and Sediment*  
13 *Control Plans*; EC-4b: *Develop and Implement Stormwater Pollution Prevention Plans*; EC-11: *Fugitive*  
14 *Dust Control*; EC-12: *On-Site Concrete Batching Plants*; and EC-14: *Construction Best Management*  
15 *Practices for Biological Resources*. Even with these commitments, however, impacts on wildlife  
16 connectivity resources, habitat connectivity, and wildlife movement from project construction,  
17 operations, and maintenance would be significant. The CMP and Mitigation Measures AES-4b:  
18 *Minimize Fugitive Light from Portable Sources Used for Construction*; AES-4c: *Install Visual Barriers*  
19 *along Access Routes, Where Necessary, to Prevent Light Spill from Truck Headlights toward Residences*;  
20 BIO-2b: *Avoid and Minimize Impacts on Terrestrial Biological Resources from Maintenance Activities*;  
21 BIO-22b: *Avoid and Minimize Operational Traffic Impacts on Wildlife*; and BIO-53: *Avoid and Minimize*  
22 *Impacts on Terrestrial Wildlife Connectivity and Movement* would be required to avoid, minimize, and  
23 mitigate impacts on wildlife connectivity resources, habitat connectivity, and wildlife movement.  
24 The impacts on wildlife connectivity resources, habitat connectivity, and wildlife movement from  
25 the project alternatives would be less than significant with mitigation because the aforementioned  
26 measures would compensate for impacts on wildlife habitat and avoid and minimize habitat and  
27 species impacts that potentially could disrupt species movement and habitat selection, habitat  
28 access, and wildlife behavior, resulting in impacts on wildlife connectivity. These measures would  
29 avoid and minimize habitat and species impacts that could cause potential for injury, mortality,  
30 disruption of normal behaviors and disturbances to habitat that potentially may disrupt species  
31 movement, habitat selection, habitat access, and wildlife behavior, resulting in impacts on wildlife  
32 connectivity, by training construction staff on protecting habitat and species, reporting  
33 requirements, and the ramifications for not following these measures; implementing spill  
34 prevention and containment plans that would avoid material spills that could affect habitat and  
35 wildlife; preventing erosion and sedimentation of habitats and stormwater pollution, which may  
36 affect habitat and wildlife; preventing dust emissions that may impact habitat and wildlife;  
37 implementing construction BMPs and having a biological monitor present to ensure that non-  
38 disturbance buffers and associated construction fencing are intact and all other protective measures  
39 are being implemented where applicable to protect habitat and wildlife; reducing fugitive light and  
40 lighting impacts that may disrupt nocturnal wildlife behavior and habitat selection; implementing  
41 environmental review and avoidance of habitat and wildlife impacts during maintenance activities;  
42 limiting vehicle speeds and implementing traffic control measures on DWR roads during operations  
43 to reduce species movement disruptions and vehicle-related mortality; and ensuring that the project  
44 prevents impacts on and facilitates habitat connectivity and safe wildlife movement.

1           **Mitigation Measure CMP: Compensatory Mitigation Plan**

2           DWR will implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to offset  
3           the loss of wetlands, waters, and habitat for several special-status species through the creation  
4           of habitat on Bouldin Island and at the I-5 ponds, and managing these areas in perpetuity, as  
5           well as purchasing mitigation credits within the region for species requiring alkaline seasonal  
6           wetland, vernal pool complex, and grassland habitat (Appendix 3F, Section 3F.3). This mitigation  
7           will create habitat in perpetuity within areas identified as important core habitat and regional  
8           wildlife corridors and will support live-in, movement, migratory, and stopover habitat for a wide  
9           variety of species inhabiting the region.

10           **Mitigation Measure AES-4b: Minimize Fugitive Light from Portable Sources Used for**  
11           **Construction**

12           See description of Mitigation Measure AES-4b under Impact AES-4 in Chapter 18.

13           **Mitigation Measure AES-4c: Install Visual Barriers along Access Routes, Where Necessary,**  
14           **to Prevent Light Spill from Truck Headlights toward Residences**

15           See description of Mitigation Measure AES-4c under Impact AES-4 in Chapter 18.

16           **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
17           **Resources from Maintenance Activities**

18           See description of Mitigation Measure BIO-ab under Impact BIO-2.

19           **Mitigation Measure BIO-22b: Avoid and Minimize Operational Traffic Impacts on Wildlife**

20           See description of Mitigation Measure BIO-22b under Impact BIO-22.

21           **Mitigation Measure BIO-53: Avoid and Minimize Impacts on Terrestrial Wildlife**  
22           **Connectivity and Movement**

23           ***All Alternatives***

24           ***Design and Construction***

25           The following measures will be implemented during project design and construction to avoid  
26           and minimize impacts on terrestrial wildlife connectivity and movement. The design of the  
27           wildlife crossing structure will include wildlife fencing and will be developed in coordination  
28           with a biologist qualified and experienced in wildlife crossing planning and design.

- 29           1. As part of project access road improvement planning, design, and construction, the project  
30           will upgrade the existing culvert on SR 12 (identified by CDFW [2020d:11] as a priority  
31           barrier to wildlife movement in the region; Barrier ID W031) to a dedicated wildlife crossing  
32           structure to facilitate movement of both aquatic and terrestrial wildlife. The wildlife  
33           crossing structure will span the banks of the channel to the maximum extent possible and  
34           will incorporate design elements to facilitate movement and connectivity of giant garter  
35           snake, western pond turtle, mink, river otter, beaver, all other reptiles and mammals  
36           inhabiting the area.

- 1           2. The new intersection for Byron Highway and the extension of Armstrong Road (Alternatives  
2           1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) will include wildlife crossing structures where the new road  
3           intersects with Brushy Creek. The wildlife crossing structure will span the banks of the  
4           channel to the maximum extent possible and will incorporate design elements to facilitate  
5           movement and connectivity of California red-legged frog, western pond turtle, and other  
6           aquatic, semi-aquatic, and terrestrial wildlife species inhabiting the area.
- 7           3. Contiguous habitat connectivity along riparian banks and corridors will be maintained  
8           during construction, to the extent practicable, to maintain connectivity at riparian banks and  
9           corridors at levees, intakes, and other facilities located along or within riparian banks and  
10          corridors. Riparian vegetation and canopy will be avoided and maintained to the maximum  
11          extent possible during construction. Design will include wildlife fencing where applicable to  
12          prevent wildlife access to construction areas that may be dangerous for wildlife, such as  
13          roads and other facilities. Fencing will also be designed and placed in a manner that  
14          facilitates wildlife movement through or between the riparian banks and corridors during  
15          constriction. Design and maintenance of habitat contiguity and fencing will be developed  
16          and overseen in coordination with a biologist qualified and experienced in wildlife crossing  
17          planning and design and will be managed in coordination with the qualified biologist during  
18          construction phasing.

### 19           ***Operations***

- 20          4. Contiguous habitat connectivity along riparian banks and riparian corridors will be  
21          maintained during operations to maintain connectivity at riparian banks and corridors at  
22          levees, intakes, and other facilities located along/within riparian banks and corridors. The  
23          native riparian vegetation and canopy in these areas will be maintained to the maximum  
24          extent possible during operation. Where maintaining and reestablishing the riparian  
25          vegetation and canopy is not possible, plans will include landscaping with native plants that  
26          will provide the maximum amount of cover and heterogeneity possible and will also  
27          consider the use of other non-vegetative options to provide cover and heterogeneity to  
28          facilitate wildlife movement such as rock piles, snags, and human-made materials, such as  
29          faux rocks and trees that provide cover, yet are lightweight and not load-bearing. Design will  
30          include wildlife fencing where applicable to prevent wildlife access to roads and facilities.  
31          Fencing will also be designed and placed in a manner that facilitates wildlife movement  
32          through or between the riparian banks and corridors during constriction. Design of habitat  
33          contiguity, revegetation, and fencing will be developed in coordination with a biologist  
34          qualified and experienced in wildlife crossing planning and design.

### 35           ***Mitigation Impacts***

36           As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
37           mitigation measure impacts. The analyses below consider the potential impacts associated with  
38           implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
39           Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
40           *Measures*.

#### 41           *Compensatory Mitigation*

42           The creation and enhancement of wetlands and other waters, as well as habitat for special-status  
43           species on Bouldin Island and at the I-5 ponds, and tidal wetland habitat restoration and channel

1 margin enhancement under the project CMP, would temporarily affect wildlife connectivity  
2 resources and wildlife movement from direct vegetation removal, grading, noise, and other  
3 disturbances to create the appropriate topography and soil conditions to establish or restore  
4 habitats. These activities would also have the potential for injury, mortality, habitat avoidance, and  
5 the disruption of normal behaviors and movements of individuals, which may have a temporary  
6 adverse impact on habitat connectivity and wildlife movement. WCGs potentially affected include  
7 low-mobility small fauna, semi-aquatic obligates, moderate-mobility small fauna, adaptive high-  
8 mobility fauna, high-openness, high-mobility carnivores, adaptive ungulates, very high-openness  
9 fauna, and aerial fauna.

10 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
11 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
12 vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located and could  
13 result in the temporary impacts on wildlife movement but would generally improve conditions for  
14 wildlife movement in the long term. Site-specific analyses are not provided because locations of  
15 potential non-bank sites are not currently known.

16 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
17 crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
18 management of agricultural areas but may also include natural communities in the study area  
19 (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
20 *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
21 *CMP-19b: Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
22 *CMP-22b: Tricolored Blackbird Foraging Habitat*). These areas being managed and protected for  
23 wildlife would generally benefit wildlife movement through the study area. Site-specific analyses are  
24 not provided because locations of potential protection instruments are not currently known.

25 Environmental Commitment EC-14: *Construction Best Management Practices for Biological Resources*  
26 (Appendix 3B) would reduce potential impacts on wildlife connectivity resources and wildlife  
27 movement by avoiding and minimizing construction direct and indirect impacts on habitats and  
28 species.

### 29 Other Mitigation Measures

30 Some other mitigation measures may affect wildlife connectivity resources and wildlife movement.  
31 Impacts may be caused by activities such as vegetation removal, grading, excavations, dredging, and  
32 construction of structures. Impacts of these measures may include habitat loss, ground disturbances,  
33 and noise causing disruption of normal movement abilities and behaviors and would be similar to  
34 construction effects of the project alternatives on wildlife connectivity resources and wildlife  
35 movement.

36 These impacts would be reduced through the CMP, Environmental Commitment EC-1: *Conduct*  
37 *Worker Awareness Training*, and Mitigation Measures BIO-2b: *Avoid and Minimize Impacts on*  
38 *Terrestrial Biological Resources from Maintenance Activities*, BIO-22b: *Avoid and Minimize*  
39 *Operational Traffic Impacts on Wildlife*, and BIO-53: *Avoid and Minimize Impacts on Terrestrial*  
40 *Wildlife Connectivity and Movement*. Therefore, impacts on wildlife connectivity resources and  
41 wildlife movement from implementation of other mitigation measures would be reduced to less  
42 than significant.

1 Overall, the impacts on wildlife connectivity resources and wildlife movement from construction of  
 2 compensatory mitigation and implementation of other mitigation measures, combined with project  
 3 alternatives, would not change the impact conclusion of less than significant with mitigation.

4 **Impact BIO-54: Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural**  
 5 **Community Conservation Plan, or Other Approved Local, Regional, or State Habitat**  
 6 **Conservation Plan**

7 To comply with CEQA, potential conflicts with the provisions of an adopted HCP, NCCP, or other  
 8 approved local, regional, or state habitat conservation plan must be analyzed. Within or near the  
 9 study area, numerous HCPs, NCCPs, and other regional conservation plans have been permitted or  
 10 are in process, including those listed below.

- 11 • *Natomas Basin HCP* (City of Sacramento et al. 2003).
- 12 • *Yolo HCP/NCCP* (Yolo Habitat Conservancy 2018).
- 13 • *Solano County Multispecies HCP* (Solano County MSHCP) (Solano County Water Agency 2012).
- 14 • *South Sacramento HCP* (SSHCP) (County of Sacramento et al. 2018).
- 15 • *East Contra Costa County HCP/NCCP* (ECCC HCP/NCCP) (East Contra Costa County Habitat  
 16 Conservation Plan Association 2006).
- 17 • *San Joaquin County Multi-Species HCP and Open Space Plan* (SJC MSHCP) (Jones & Stokes 2000).
- 18 • *East Alameda County Conservation Strategy* (EACCS) (East Alameda County Conservation  
 19 Strategy Steering Committee 2010).

20 The Natomas Basin HCP is located in northwestern Sacramento and southern Sutter Counties,  
 21 approximately 0.5 mile north of and upstream of the study area, but does not border or overlap with  
 22 it. Because of the lack of overlap and the location of the Natomas Basin HCP upstream of the study  
 23 area, it is not discussed further in this section.

24 The Yolo HCP/NCCP and Solano County MSHCP overlap the northwestern portion of the study area,  
 25 but no construction would take place in the plan areas of these plans (Table 13-102, Figure 13-99).  
 26 The north Delta intake locations are across the Sacramento River from the Yolo HCP/NCCP  
 27 southeastern border, and the Solano County MSHCP is located approximately 3.4 miles southeast of  
 28 the nearest project feature. Because no construction impacts would take place in the plan areas, and  
 29 no existing preserves are located immediately adjacent to project construction, these plans are not  
 30 discussed further in this section.

31 **Table 13-102. Summary Table of Conservation Plans that Overlap with the Project Study Area**

Conservation Plan	Plan Status	Permit Term (years)	Plan Area (acres)	Boundary Overlap with Study Area (acres)	Proportion of Conservation Plans That Overlap Study Area
East Contra Costa County HCP/NCCP	Approved in 2007	30	174,018	63,002	36%
San Joaquin County MSHCP and Open Space Plan	Approved in 2001	50	912,386	318,898	35%



Conservation Plan	Plan Status	Permit Term (years)	Plan Area (acres)	Boundary Overlap with Study Area (acres)	Proportion of Conservation Plans That Overlap Study Area
South Sacramento HCP	Approved in 2019	50	317,655	43,958	14%
East Alameda County Conservation Strategy	Approved in 2011	N/A	271,486	6,470	2%

Sources: TRA Environmental Services 2011; County of Sacramento et al. 2000, 2018; East Alameda County Conservation Strategy Steering Committee 2010; East Contra Costa County Habitat Conservation Plan Association 2006.

HCP = habitat conservation plan; NCCP = natural communities conservation plan; MSHCP = multi-species habitat conservation plan; N/A = not applicable.

The remaining three HCPs and one conservation strategy overlap with the study area and the project construction footprint to varying extents (Table 13-102, Figure 13-99) and are described in Section 13.1, *Environmental Setting*.

### ***All Project Alternatives***

#### ***Construction***

Construction of water conveyance facilities would result in permanent surface impacts within the boundaries of the three overlapping conservation plans and the EACCS that could reduce the availability of land for acquisition, cause temporary impacts that could affect quality of habitats and agricultural lands, and cause impacts on species and natural communities covered by these plans (Figure 13-99). To quantify the potential effects of construction of the project on overlapping plans, the permanent surface impacts of all project alternatives were identified (Table 13-103).

**Table 13-103. Impacts from Construction of Water Conveyance Facilities under the Alternatives Relative to Total Area of Overlap With Conservation Plans**

Alternative	Permanent Surface Impacts (acres)	Proportion of Surface Impacts Relative to Plan Area (% of plan area)
<b>Plan: South Sacramento HCP</b>		
<b>Plan Area: 317,655 acres</b>		
1	488.80	0.1%
2a	564.38	0.2%
2b	192.82	0.1%
2c	352.76	0.1%
3	483.33	0.2%
4a	698.93	0.2%
4b	192.82	0.1%
4c	384.79	0.1%
5	542.41	0.2%
<b>Plan: San Joaquin County MSHCP</b>		
<b>Plan Area: 912,386 acres</b>		
1	895.26	0.1%
2a	905.98	0.1%

Alternative	Permanent Surface Impacts (acres)	Proportion of Surface Impacts Relative to Plan Area (% of plan area)
2b	798.33	0.1%
2c	841.12	0.1%
3	338.50	<0.1%
4a	369.71	<0.1%
4b	298.02	<0.1%
4c	319.53	<0.1%
5	425.92	<0.1%
<b>Plan: East Contra Costa County HCP/NCCP</b>		
<b>Plan Area: 174,018 acres</b>		
1, 2b, 2c, 4b	1,392.64	0.8%
2a	1,400.40	0.8%
3	1,423.70	0.8%
4a	1,455.36	0.8%
4c	1,410.59	0.8%
5	0.16	<0.01%
<b>Plan: East Alameda County Conservation Strategy</b>		
<b>Plan Area: 271,486 acres</b>		
1, 2b, 2c, 3, 4b, 4c	33.68	<0.1%
2a, 4a	118.19	<0.1%
5	326.39	0.1%

HCP = habitat conservation plan; NCCP = natural community conservation plan; MSHCP = multispecies habitat conservation plan.

The surface impacts of all project alternatives represent less than 1% of the plan areas of each of the overlapping conservation plans. In general, the central alignment alternatives (Alternatives 1, 2a, 2b, and 2c) would have greater surface impacts within the overlapping conservation plans than the eastern or Bethany Reservoir alignment alternatives (Alternatives 3, 4a, 4b, 4c, and 5), primarily due to the larger disturbance area on Bouldin Island. Alternative 5 would have the least surface impacts across all overlapping conservation plans because it does not include construction of the Southern Complex (Table 13-103). No permanent surface impacts would occur within existing or planned preserves for any of the overlapping conservation plans. For all alternatives, Mitigation Measure AG-1: *Preserve Agricultural Land* would reduce the extent of impacts on Important Farmland by mitigating at a ratio of at least 1:1 for permanent loss of Important Farmland. Appendix 15B, *Agricultural and Land Stewardship Considerations*, describes the methodology employed during the initial siting and design process to greatly minimize the extent of farmland that would be permanently converted as a result of the project alternatives. Environmental Commitment EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B) would ensure that temporarily disturbed areas are restored within 1 year. Environmental Commitments EC-1: *Conduct Worker Awareness Training* and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B), and applicable biological resources mitigation measures found in this chapter would avoid and minimize construction-related impacts on species covered under the conservation plans. The CMP would ensure that impacts due to loss of habitat for covered special-status species, natural communities, and aquatic resources are mitigated through habitat protection (Appendix 3F).

1 For all project alternatives, the intakes and Twin Cities Complex would occur within the SSHCP plan  
2 area in PPU 6. The difference in impact magnitude between these alternatives within the SSHCP  
3 reflects differences between the number and size of intake structures (Table 13-103). Alternatives  
4 2a and 4a would have the greatest impacts due to the construction of three intake facilities.  
5 Alternatives 1, 3, and 5 would have slightly greater impacts than Alternatives 2c and 4c due to the  
6 slightly larger footprint of Intake C; a larger RTM area at the Twin Cities Complex would result in  
7 greater impacts under Alternative 5 than Alternatives 1 or 3. Alternatives 2b and 4b would have the  
8 smallest impacts due to the use of one intake facility. The alternative with the greatest surface  
9 impacts in the SSHCP (Alternative 4a) would permanently remove up to 589 acres of agricultural, 16  
10 acres of grassland, 7 acres of riparian, and less than 0.1 acre of vernal pool habitats targeted for  
11 preservation, but for all alternatives this would represent a small proportion of land available within  
12 the overlap area (Appendix 13D, *Overlapping Habitat Conservation Plan Permanent Surface Impacts*).  
13 Improvements to existing roads would take place within existing SSHCP cropland preserves but no  
14 new permanent surface impacts would occur within these preserves (County of Sacramento et al.  
15 2018:Figure 7-4) and temporarily disturbed areas would be restored within 1 year.

16 Alternatives 1, 2a, 2b, and 2c would have substantially greater impacts in the SJC MSHCP plan area  
17 relative to Alternatives 3, 4a, 4b, 4c, and 5, primarily because of the larger area for access roads and  
18 levee improvements on Bouldin Island, as well as access roads to tunnel shafts on Bacon and  
19 Mandeville Islands. Among the central and eastern alignment alternatives, those with a higher flow  
20 capacity require larger RTM footprints and, therefore, would have larger permanent surface  
21 impacts; Alternatives 2a and 4a (7,500 cfs) would have the greatest impact of the central and  
22 eastern alignments, respectively, and Alternative 2b and 4b (3,000 cfs) would have the least impact  
23 (Table 13-103). Because construction on Bouldin Island would take place on private property, the  
24 larger surface impact from Alternatives 1, 2a, 2b, and 2c would not result in increased reduction of  
25 land available for preservation under the SJC MSHCP, relative to the eastern alignment alternatives.  
26 Although all project alternatives would result in the removal of lands available for conservation in  
27 the Delta Zone, this area represents only a small proportion of the total lands available in the Delta  
28 Zone (Appendix 13D), and no new permanent surface impacts would occur within existing or  
29 planned SJC MSHCP preserves (San Joaquin Council of Governments 2020:Attachment C, Figure 1,  
30 page 48).

31 Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c would have similar surface impacts in the ECCC  
32 HCP/NCCP plan area from the construction of the Southern Complex on Byron Tract and west of  
33 Byron Highway (Table 13-103), including permanently removing approximately 1,285 acres of  
34 agriculture and 1.6 acres of alkali seasonal wetland (Appendix 13D). Alternatives 2a and 4a would  
35 have slightly greater permanent impacts than Alternatives 1, 2b, 2c, 3, 4b, and 4c because of the  
36 larger RTM area at the Southern Complex on Byron Tract. Alternative 5, which does not involve  
37 construction of the Southern Complex on Byron Tract or west of Byron Highway, would have  
38 minimal impacts within the ECCC HCP/NCCP plan area and would not remove agricultural or alkali  
39 seasonal wetland habitats targeted for preservation by the plan (Appendix 13D). Although all  
40 project alternatives would result in the removal of lands available for conservation, this land  
41 represents only a small proportion of the total lands available (Appendix 13D) and no new  
42 permanent surface impacts would occur within existing or planned ECCC HCP/NCCP preserves (East  
43 Contra Costa County Habitat Conservancy 2020:Figure 7).

44 Construction of all project alternatives would affect habitat for species identified as conservation  
45 priorities in the EACCS Conservation Zones 6 and 7, specifically, San Joaquin kit fox and California  
46 red-legged frog (Table 13-103). Alternative 5 would result in the greatest surface impacts that

1 would remove lands available for conservation in the EACCS study area relative to the other  
2 alternatives because of construction of the Bethany Complex, which would only be constructed  
3 under Alternative 5. Alternatives 2a and 4a would have similar impacts resulting construction of an  
4 additional outlet and control structure on the Delta-Mendota Canal. Alternatives 1, 2b, 2c, 3, 4b, and  
5 4c would have minimal surface impacts in the EACCS plan area. Although all project alternatives  
6 would result in the removal of lands available for conservation, this land represents only a small  
7 proportion of the total lands available (Appendix 13D) and impacts on species included in the EACCS  
8 would be mitigated.

9 Field investigations for all project alternatives would be conducted prior to and during construction  
10 and would involve a variety of ground-disturbing activities (Section 3.15), some of which could  
11 result in impacts on biological resources covered under overlapping conservation plans.

12 Geotechnical investigations associated with the West Tracy Fault and the tunnels for all alternatives,  
13 which include test trenches, CPTs, and soil borings, would result in impacts on riparian and species  
14 habitat (Appendix 13C). Geotechnical investigations associated with all the tunnels for all  
15 alternatives would avoid impacts on wetlands as specified in Environmental Commitment EC-14:  
16 *Construction Best Management Practices for Biological Resources* (Appendix 3B). Field investigations  
17 within proposed surface construction footprints (including portions of tunnel alignments), which  
18 include test trenches, CPTs, soil borings, ERT, groundwater testing and monitoring, monument  
19 installation, pilot studies for settlement, agronomic testing, and utility potholing, would temporarily  
20 impact habitats. These temporary impacts are not characterized as an additional loss of habitat  
21 because impacts for these locations have already been quantified within the construction footprints.  
22 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
23 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
24 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
25 *Biological Resources* (Appendix 3B) would reduce these potential impacts by training construction  
26 staff on the needs of protecting sensitive biological resources, reporting requirements, and the  
27 ramifications for not following these measures; implementing spill prevention and containment  
28 plans that would avoid material spills that could affect the viability of habitats; having a biological  
29 monitor present to ensure that non-disturbance buffers and associated construction fencing are  
30 intact and all other protective measures are being implemented where applicable; and ensuring that  
31 temporarily disturbed areas are restored within one year. Generally, field investigation impacts  
32 would be minimal and not result in a conflict with approved conservation plans.

### 33 Operations & Maintenance

34 The operation and maintenance of project facilities would not result in additional surface impacts  
35 within the overlapping conservation plans for all project alternatives. These activities would take  
36 place within the permanent surface impact construction footprint, so there would be no additional  
37 impacts on the overlapping conservation plans. Mitigation Measure BIO-2b: *Avoid and Minimize*  
38 *Impacts on Biological Resources from Maintenance Activities*, would reduce the impacts on species  
39 covered under the conservation plans.

### 40 **CEQA Conclusion—All Project Alternatives**

41 Construction of all project alternatives would result in permanent and temporary surface impacts on  
42 landcover types covered by the plans and reduce the availability of lands for conservation for the  
43 three HCPs that overlap with the study area. Because the temporary impacts and permanent loss of  
44 potential conservation lands represents a small proportion of the lands available for conservation,

1 these impacts are not anticipated to affect implementation of the overlapping plans. Permanent  
2 impacts on covered species habitat and natural communities would be mitigated with the CMP  
3 (Appendix 3F), and Mitigation Measure AG-1: *Preserve Agricultural Land* would reduce the extent of  
4 impacts on Important Farmland by mitigating at a ratio of at least 1:1 for permanent loss of  
5 Important Farmland. Environmental Commitment EC-14: *Construction Best Management Practices*  
6 *for Biological Resources* (Appendix 3B) would ensure temporary impacts on covered species habitat  
7 and natural communities would be restored within one year. The CMP habitat creation and  
8 enhancement sites at Bouldin Island and the I-5 ponds are within the SJC MSHCP plan area;  
9 purchase of agency-approved mitigation bank credits or other site protection instruments would  
10 offset impacts on emergent wetland, vernal pool, California red-legged frog, California tiger  
11 salamander, greater sandhill crane, tricolored blackbird, San Joaquin kit fox, Swainson's hawk, and  
12 vernal pool branchiopods at sites approved by regulatory agencies. The Tidal Habitat Mitigation  
13 Framework would offset habitat loss of emergent wetland, tidal channel, and habitat for California  
14 black rail using a programmatic approach at appropriate sites that would provide suitable habitat  
15 (Appendix 3F, Section 3F.4.3, *Tidal Habitat Mitigation Framework*).

16 Construction of all project alternatives could have impacts on special-status species that conflict  
17 with covered species goals and objectives of the overlapping conservation plans, which would be a  
18 significant impact. Environmental Commitment EC-14: *Construction Best Management Practices for*  
19 *Biological Resources* (Appendix 3B) would ensure that temporarily disturbed areas are restored. The  
20 following environmental commitments would avoid the impacts on special-status species in  
21 overlapping areas of adopted HCPs and NCCPs and other conservation plans: EC-1: *Conduct Worker*  
22 *Awareness Training* and EC-14: *Construction Best Management Practices for Biological Resources*  
23 (Appendix 3B). The following mitigation measures specific to terrestrial biological resources would  
24 also avoid and minimize construction-related impacts on species that are covered under the  
25 conservation plans: Mitigation Measures BIO-2b: *Avoid or Minimize Impacts on Special-Status*  
26 *Natural Communities and Special-Status Plants*, BIO-14: *Avoid and Minimize Impacts on Vernal Pool*  
27 *Aquatic Invertebrates and Critical Habitat for Vernal Pool Fairy Shrimp*, BIO-18a: *Avoid and Minimize*  
28 *Impacts on Valley Elderberry Longhorn Beetle*, BIO-22a: *Avoid and Minimize Impacts on California*  
29 *Tiger Salamander*, BIO-24a: *Avoid and Minimize Impacts on California Red-Legged Frog and Critical*  
30 *Habitat*, BIO-25: *Avoid and Minimize Impacts on Western Pond Turtle*, BIO-26: *Avoid and Minimize*  
31 *Impacts on Special-Status Reptiles*, BIO-30: *Avoid and Minimize Impacts on Giant Garter Snake*, BIO-  
32 *31: Avoid and Minimize Impacts on Western Yellow-Billed Cuckoo*, BIO-32: *Conduct Preconstruction*  
33 *Surveys and Implement Protective Measures to Avoid Disturbance of California Black Rail*, BIO-33:  
34 *Minimize Disturbance of Sandhill Cranes*, BIO-36a: *Conduct Nesting Surveys for Special-Status and*  
35 *Non-Special-Status Birds and Implement Protective Measures to Avoid Disturbance of Nesting Birds*  
36 *and Raptors*, BIO-35: *Avoid and Minimize Impacts on Cormorant, Heron, and Egret Rookeries*, BIO-  
37 *36b: Conduct Preconstruction Surveys and Implement Protective Measures to Avoid Disturbance of*  
38 *White-Tailed Kite*, BIO-39: *Conduct Preconstruction Surveys and Implement Protective Measures to*  
39 *Minimize Disturbance of Swainson's Hawk*, BIO-40: *Conduct Surveys and Minimize Impacts on*  
40 *Burrowing Owl*, BIO-44a: *Conduct Preconstruction Surveys and Implement Protective Measures to*  
41 *Avoid Disturbance of Tricolored Blackbird*, and BIO-47: *Conduct Preconstruction Survey for American*  
42 *Badger and Implement Avoidance and Minimization Measures*.

43 Mitigation Measure BIO-2b: *Avoid and Minimize Impacts on Biological Resources from Maintenance*  
44 *Activities* would reduce impacts on covered species during maintenance activities.

45 Because the project alternatives would only remove a small proportion of available lands for  
46 conservation, and thus not obstruct the plans' conservation goals, and with implementation of the

1 above measures to avoid and minimize impacts on covered species and habitats, the impact on an  
2 adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan would be  
3 less than significant with mitigation.

4 **Mitigation Measure CMP: Compensatory Mitigation Plan**

5 DWR will implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to offset  
6 the loss habitat for species and natural communities covered by the overlapping habitat  
7 conservation plans (Appendix 3F, Sections 3F.3.2 and 3F 3.3, and Attachment 3F.1, Tables 3F.1-2  
8 and 3F.1-3) by providing compensatory mitigation. The mitigation approach includes initial  
9 mitigation actions at specific sites, purchase of mitigation credits at existing or proposed  
10 mitigation banks, and proposing a mitigation framework for future compensatory mitigation  
11 actions for tidal habitats.

12 **Mitigation Measure BIO-2a: Avoid or Minimize Impacts on Special-Status Natural**  
13 **Communities and Special-Status Plants**

14 See description of Mitigation Measure BIO-2a under Impact BIO-2.

15 **Mitigation Measure BIO-14: Avoid and Minimize Impacts on Vernal Pool Aquatic**  
16 **Invertebrates and Critical Habitat for Vernal Pool Fairy Shrimp**

17 See description of Mitigation Measure BIO-14 under Impact BIO-14.

18 **Mitigation Measure BIO-18: Avoid and Minimize Impacts on Valley Elderberry Longhorn**  
19 **Beetle**

20 See description of Mitigation Measure BIO-18 under Impact BIO-18.

21 **Mitigation Measure BIO-22a: Avoid and Minimize Impacts on California Tiger Salamander**

22 See description of Mitigation Measure BIO-22a under Impact BIO-22.

23 **Mitigation Measure BIO-24a: Avoid and Minimize Impacts on California Red-Legged Frog**  
24 **and Critical Habitat**

25 See description of Mitigation Measure BIO-24a under Impact BIO-24.

26 **Mitigation Measure BIO-25: Avoid and Minimize Impacts on Western Pond Turtle**

27 See description of Mitigation Measure BIO-25 under Impact BIO-25.

28 **Mitigation Measure BIO-26: Avoid and Minimize Impacts on Special-Status Reptiles**

29 See description of Mitigation Measure BIO-26 under Impact BIO-26.

30 **Mitigation Measure BIO-30: Avoid and Minimize Impacts on Giant Garter Snake**

31 See description of Mitigation Measure BIO-30 under Impact BIO-30.

1           **Mitigation Measure BIO-31: Avoid and Minimize Impacts on Western Yellow-Billed**  
2           **Cuckoo**

3           See description of Mitigation Measure BIO-31 under Impact BIO-31.

4           **Mitigation Measure BIO-32: Conduct Preconstruction Surveys and Implement Protective**  
5           **Measures to Avoid Disturbance of California Black Rail**

6           See description of Mitigation Measure BIO-32 under Impact BIO-32.

7           **Mitigation Measure BIO-33: Minimize Disturbance of Sandhill Cranes**

8           See description of Mitigation Measure BIO-33 under Impact BIO-33.

9           **Mitigation Measure BIO-35: Avoid and Minimize Impacts on Cormorant, Heron, and Egret**  
10          **Rookeries**

11          See description of Mitigation Measure BIO-35 under Impact BIO-35.

12          **Mitigation Measure BIO-36a: Conduct Nesting Surveys for Special-Status and Non-Special-**  
13          **Status Birds and Implement Protective Measures to Avoid Disturbance of Nesting Birds**  
14          **and Raptors**

15          See description of Mitigation Measure BIO-36a under Impact BIO-36.

16          **Mitigation Measure BIO-36b: Conduct Preconstruction Surveys and Implement Protective**  
17          **Measures to Avoid Disturbance of White-Tailed Kite**

18          See description of Mitigation Measure BIO-36b under Impact BIO-36.

19          **Mitigation Measure BIO-39: Conduct Preconstruction Surveys and Implement Protective**  
20          **Measures to Minimize Disturbance of Swainson's Hawk**

21          See description of Mitigation Measure BIO-39 under Impact BIO-39.

22          **Mitigation Measure BIO-40: Conduct Surveys and Minimize Impacts on Burrowing Owl**

23          See description of Mitigation Measure BIO-40 under Impact BIO-40.

24          **Mitigation Measure BIO-44: Conduct Preconstruction Surveys and Implement Protective**  
25          **Measures to Avoid Disturbance of Tricolored Blackbird**

26          See description of Mitigation Measure BIO-44 under Impact BIO-44.

27          **Mitigation Measure BIO-47: Conduct Preconstruction Survey for American Badger and**  
28          **Implement Avoidance and Minimization Measures**

29          See description of Mitigation Measure BIO-47 under Impact BIO-47.

30          **Mitigation Measure AG-1: Preserve Agricultural Land**

31          See description of Mitigation Measure AG-1 under Chapter 15, *Agricultural Resources*,  
32          Impact AG-1.

## 1 ***Mitigation Impacts***

2 As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
3 mitigation measure impacts. The analyses below consider the potential impacts associated with  
4 implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
5 Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
6 *Measures*.

### 7 *Compensatory Mitigation*

8 The CMP (Appendix 3F) would include creation and enhancement of wetlands on Bouldin Island and  
9 ponds west of I-5, which would occur within the plan area of the SJC MSHCP. These activities would  
10 occur on private and state-owned property and would not reduce the availability of conservation  
11 lands for the SJC MSHCP.

12 The CMP commitments to create and enhance wetlands and other special-status species habitat and  
13 purchase mitigation credits would increase availability of suitable habitat for several species  
14 covered under the conservation plans, which would offset impacts on these species and assist the  
15 plans in achieving their covered species conservation goals.

16 In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
17 enhancement (Appendix 3F, Section 3F.3.2.4), these activities would take place in areas where  
18 vernal pool complexes, alkaline seasonal wetlands, or associated grasslands are located.  
19 Construction and maintenance activities at the non-bank sites could result in the temporary  
20 disturbance of existing habitat and the potential for injury or mortality of vernal pool and grassland  
21 species covered by the conservation plans but would ultimately provide benefits for these species.  
22 The overlapping conservation plans include land conservation goals to protect these habitat types.  
23 Non-bank mitigation sites would be prioritized in the Altamont Hills recovery area (Appendix 3F,  
24 Attachment 3F.1, Table 3F.1-3), which is outside of the plan areas of any adopted conservation  
25 plans, therefore using non-bank sites would not conflict with the conservation goals and objectives  
26 of adopted conservation plans. The Altamont Hills recovery area is located within the EACCS study  
27 area. While the EACCS is not an adopted conservation plan, it contains habitat conservation goals  
28 used as a guide to facilitate species conservation. Implementing non-bank sites in this area would  
29 contribute to the EACCS conservation goal of protecting 90% of alkali wetland and seasonal wetland  
30 habitat within the EACCS study area (East Alameda County Conservation Strategy Steering  
31 Committee 2010:3.32). Site-specific analyses are not provided because locations of potential non-  
32 bank sites are not currently known.

33 Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
34 crane, Swainson's hawk, and tricolored blackbird would consist of the protection and management  
35 of agricultural areas and natural communities in the study area (Appendix 3F, Section 3F.4.2.2,  
36 Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting Habitat*, CMP-18b: *Sandhill Crane*  
37 *Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*, CMP-19b: *Swainson's Hawk Foraging*  
38 *Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and CMP-22b: *Tricolored Blackbird Foraging*  
39 *Habitat*). These protected areas could also contain habitat for species covered under the  
40 conservation plans and management activities could affect this habitat and result in the disruption  
41 of normal behaviors, injury, and mortality. Site-specific analyses are not provided because locations  
42 of potential protection instruments are not currently known.



1 Implementing site protection instruments within the plan areas of adopted conservation plans has  
2 the potential to reduce the availability of suitable lands to meet the conservation goals and  
3 objectives of those plans. Approximately 50% of the SSHCP PPU 6 overlaps with the study area  
4 (County of Sacramento et al. 2020:Figure 7-2). The SSHCP habitat conservation goal for PPU 6 of  
5 8,465 acres of agriculture represents 14% of available agricultural land cover and 623 acres of  
6 grassland represents 4% of available grassland habitat in PPU 6 (County of Sacramento et al.  
7 2018:7-87-7-88, Table 7-6). The study area overlaps with approximately 25% of ECCC HCP/NCCP  
8 Zone 2, 20% of Zone 5, and 100% of Zone 6. The ECCC HCP/NCCP habitat conservation goal for Zone  
9 2 is 4,900 acres of annual grassland, which represents 48% of the annual grassland in Zone 2 (East  
10 Contra Costa County Habitat Conservation Plan Association 2006:Table 5-14). The goal for Zone 6 is  
11 250 to 400 acres of cropland or irrigated pasture, which represents 1% to 2% of the available  
12 cropland or irrigated pasture in Zone 6 (East Contra Costa County Habitat Conservation Plan  
13 Association 2006:5-41-5-43). Zone 5 of the ECCC HCP/NCCP has a goal of 5,300 to 8,100 acres of  
14 annual grassland conservation, which represents 49% to 75% of the available annual grassland in  
15 Zone 5 (East Contra Costa County Habitat Conservation Plan Association 2006: Table 5-11). The  
16 Delta Zone of the SJC MSHCP is entirely within the study area (San Joaquin Council of Governments  
17 2020:48). The SJC MSHCP does not have habitat conservation targets; however, the Delta Zone  
18 contains 210,488 acres of agricultural land (Appendix 13D and the current Delta Zone preserve  
19 system consists of 5,100 acres of agricultural land (San Joaquin Council of Governments 2020:21,  
20 Table 6), which represents 2% of the available agricultural land in the Delta Zone. Site protection for  
21 greater sandhill crane roosts would require minimum patches of 40 acres and minimum patches of  
22 160 acres of foraging habitat within 2 miles of roosts, which would fall within the SSHCP and SJC  
23 MSHCP plan areas (Appendix 3F, Attachment 3F.1, Table 3F.1-3). Swainson's hawk site protection  
24 would occur in patches of at least 40 acres within 50 miles of the study area (Appendix 3F,  
25 Attachment 3F.1, Table 3F.1-3), which provides a large area where the sites could be located. For  
26 most zones of the overlapping conservation plans, the large area of available agricultural land and  
27 annual grassland, relative to land conservation goals, indicates that site protection instruments  
28 would not encumber conservation lands such that the CMP would conflict with the land  
29 conservation goals of the adopted conservation plans. In addition, the CMP includes a commitment  
30 to coordinate with applicable conservation plans prior to acquiring site protection instruments  
31 within a plan area to ensure they do not conflict with the plans or their ability to achieve their  
32 biological goals and objectives (Appendix 3F, Section 3F.4.2.2, *Site Protection Instruments*).

33 The creation and enhancement of wetlands and other waters, as well as habitat for special-status  
34 species, non-bank mitigation, and management of site protection instruments under the CMP could  
35 result in injury, mortality, or disruption of normal behaviors of these species that conflict with  
36 covered species goals and objectives of the overlapping conservation plans, which would be a  
37 significant impact. Environmental Commitment EC-14: *Construction Best Management Practices for*  
38 *Biological Resources* (Appendix 3B) would ensure that temporarily disturbed areas are restored  
39 within 1 year. The following environmental commitments and general mitigation measures would  
40 avoid the impacts on covered special-status species in overlapping areas of adopted HCPs and  
41 NCCPs and other conservation plans: EC-1: *Conduct Worker Environmental Awareness Training* and  
42 EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B). The  
43 following mitigation measures specific to terrestrial biological resources would also avoid and  
44 minimize construction-related impacts on species that are covered under the conservation plans:  
45 Mitigation Measures BIO-2b: *Avoid or Minimize Impacts on Special-Status Natural Communities and*  
46 *Special-Status Plants*, BIO-18a: *Avoid and Minimize Impacts on Valley Elderberry Longhorn Beetle*,  
47 BIO-25: *Avoid and Minimize Impacts on Western Pond Turtle*, BIO-26: *Avoid and Minimize Impacts on*

1 *Special-Status Reptiles, BIO-30: Avoid and Minimize Impacts on Giant Garter Snake, BIO-31: Avoid and*  
2 *Minimize Impacts on Western Yellow-Billed Cuckoo, BIO-32: Conduct Preconstruction Surveys and*  
3 *Implement Protective Measures to Avoid Disturbance of California Black Rail, BIO-33: Minimize*  
4 *Disturbance of Sandhill Cranes, BIO-36a: Conduct Nesting Surveys for Special-Status and Non-Special-*  
5 *Status Birds and Implement Protective Measures to Avoid Disturbance of Nesting Birds and Raptors,*  
6 *BIO-35: Avoid and Minimize Impacts on Cormorant, Heron, and Egret Rookeries, BIO-36b: Conduct*  
7 *Preconstruction Surveys and Implement Protective Measures to Avoid Disturbance of White-Tailed*  
8 *Kite, BIO-39: Conduct Preconstruction Surveys and Implement Protective Measures to Minimize*  
9 *Disturbance of Swainson's Hawk, BIO-40: Conduct Surveys and Minimize Impacts on Burrowing Owl,*  
10 *BIO-44a: Conduct Preconstruction Surveys and Implement Protective Measures to Avoid Disturbance of*  
11 *Tricolored Blackbird, and BIO-47: Conduct Preconstruction Survey for American Badger and*  
12 *Implement Avoidance and Minimization Measures.*

13 Because habitat creation and enhancement, non-bank mitigation, and site protection instruments  
14 under the CMP would not significantly reduce the availability of conservation lands for the SJC  
15 MSHCP, the CMP commitment to protect habitat would offset habitat loss for covered species and  
16 natural communities, and the environmental commitments and mitigation measures listed above  
17 would reduce impacts on covered species; the CMP would not conflict with the provisions of an  
18 adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plans.

19 The potential for the project alternatives with the CMP to conflict with the provisions of an adopted  
20 habitat conservation plan, natural community conservation plan, or other approved local, regional,  
21 or state plan would be less than significant with mitigation.

## 22 Other Mitigation Measures

23 Some other mitigation measures may cause impacts on habitat and species covered by overlapping  
24 adopted HCPs and NCCPs and other conservation plans and reduce the availability of lands for  
25 conservation for the three habitat conservation plans that overlap with the study area. Impacts may  
26 be caused by activities such as grading, excavations, dredging, fill, and construction of structures.  
27 Impacts of these measures may include habitat degradation, habitat loss, ground disturbances, and  
28 noise that may cause disruption of normal wildlife behaviors, hydrological changes, altered drainage  
29 patterns, and sedimentation, which may affect habitat for covered special-status species, natural  
30 communities, and aquatic resources. Impacts would be similar to construction effects of the project  
31 alternatives on habitat conservation plans.

32 These impacts would be reduced through the CMP; Environmental Commitment EC-14: *Construction*  
33 *Best Management Practices for Biological Resources*; and Mitigation Measures BIO-2b: *Avoid or*  
34 *Minimize Impacts on Special-Status Natural Communities and Special-Status Plants*; BIO-14: *Avoid and*  
35 *Minimize Impacts on Vernal Pool Aquatic Invertebrates and Critical Habitat for Vernal Pool Fairy*  
36 *Shrimp*; BIO-18a: *Avoid and Minimize Impacts on Valley Elderberry Longhorn Beetle*; BIO-22a: *Avoid*  
37 *and Minimize Impacts on California Tiger Salamander*; BIO-24a: *Avoid and Minimize Impacts on*  
38 *California Red-Legged Frog and Critical Habitat*; BIO-25: *Avoid and Minimize Impacts on Western*  
39 *Pond Turtle*; BIO-26: *Avoid and Minimize Impacts on Special-Status Reptiles*; BIO-30: *Avoid and*  
40 *Minimize Impacts on Giant Garter Snake*; BIO-31: *Avoid and Minimize Impacts on Western Yellow-*  
41 *Billed Cuckoo*; BIO-32: *Conduct Preconstruction Surveys and Implement Protective Measures to Avoid*  
42 *Disturbance of California Black Rail*; BIO-33: *Minimize Disturbance of Sandhill Cranes*; BIO-36a:  
43 *Conduct Nesting Surveys for Special-Status and Non-Special-Status Birds and Implement Protective*  
44 *Measures to Avoid Disturbance of Nesting Birds and Raptors*; BIO-35: *Avoid and Minimize Impacts on*

1 *Cormorant, Heron, and Egret Rookeries*; BIO-36b: *Conduct Preconstruction Surveys and Implement*  
2 *Protective Measures to Avoid Disturbance of White-Tailed Kite*; BIO-39: *Conduct Preconstruction*  
3 *Surveys and Implement Protective Measures to Minimize Disturbance of Swainson's Hawk*; BIO-40:  
4 *Conduct Surveys and Minimize Impacts on Burrowing Owl*; BIO-44a: *Conduct Preconstruction Surveys*  
5 *and Implement Protective Measures to Avoid Disturbance of Tricolored Blackbird*; BIO-47: *Conduct*  
6 *Preconstruction Survey for American Badger and Implement Avoidance and Minimization Measures*;  
7 and AG-1: *Preserve Agricultural Land*. Therefore, impacts on adopted HCPs and NCCPs and other  
8 conservation plans from implementation of other mitigation measures would be reduced to less  
9 than significant.

10 Overall, the impacts on adopted HCPs and NCCPs and other conservation plans from construction of  
11 compensatory mitigation and implementation of other mitigation measures, combined with project  
12 alternatives, would not change the impact conclusion of less than significant with mitigation.

### 13 **Impact BIO-55: Conflict with Any Local Policies or Ordinances Protecting Biological** 14 **Resources, Such as a Tree Preservation Policy or Ordinance**

#### 15 ***All Project Alternatives***

##### 16 *Construction*

17 The construction of all of the project alternatives would result in impacts on terrestrial biological  
18 resources identified for protection in goals and policies of general plans and ordinances for local  
19 jurisdictions overlapping with the project footprint. The central alignment alternatives (Alternatives  
20 1, 2a, 2b, and 2c) would affect biological resources identified for protection in the general plans for  
21 Sacramento, San Joaquin County, Contra Costa, and Alameda Counties (County of Sacramento  
22 2017:1-88; County of San Joaquin 2016:3.4-1-3.4-21; County of Contra Costa 2005:33-35; County  
23 of Alameda 2000:33-35), which includes general policies for the protection of riparian habitat,  
24 wetlands, and special-status species habitat. The eastern alignment alternatives (Alternatives 3, 4a,  
25 4b, and 4c) and the Bethany Reservoir alignment alternative (Alternative 5) would similarly affect  
26 the same resources in those counties, in addition to affecting biological resources identified in  
27 policies in the City of Stockton *Envision Stockton 2040 General Plan* (2018). Environmental  
28 Commitment EC-14: *Construction Best Management Practices for Biological Resources* would ensure  
29 that temporarily disturbed areas are restored (Appendix 3B).

30 All project alternatives would result in impacts on riparian habitat that likely meet the criteria for  
31 protection under Sacramento, San Joaquin, and Contra Costa County ordinances. Tree protection  
32 ordinances for the City of Stockton and Alameda County are limited to those in local rights-of-way or  
33 parks, and none of the alternatives would affect habitat supporting trees in these areas. All project  
34 alternatives would include the construction of a portion of a new SCADA line within the City of  
35 Sacramento; however, the line would be attached to existing poles located in grassland or developed  
36 areas lacking trees. Environmental Commitment EC-14: *Construction Best Management Practices for*  
37 *Biological Resources* would ensure that temporarily disturbed areas are restored (Appendix 3B).

38 Field investigations for all project alternatives would be conducted prior to and during construction  
39 and would involve a variety of ground-disturbing activities (Section 3.15), some of which could  
40 result in impacts on biological resources identified for protection by local policies and ordinances.  
41 Geotechnical investigations associated with the West Tracy Fault and the tunnels for all alternatives,  
42 which include test trenches, CPTs, and soil borings, would result in impacts on riparian and species

1 habitat (Appendix 13C). Geotechnical investigations associated with all tunnels for all alternatives  
2 would avoid impacts on wetland as specified in Environmental Commitment EC-14: *Construction*  
3 *Best Management Practices for Biological Resources* (Appendix 3B). Field investigations within  
4 proposed surface construction footprints (including portions of tunnel alignments), which include  
5 test trenches, CPTs, soil borings, ERT, groundwater testing and monitoring, monument installation,  
6 pilot studies for settlement, agronomic testing, and utility potholing, would temporarily affect  
7 habitats. These temporary impacts are not characterized as an additional loss of habitat because  
8 impacts in these locations have already been quantified within the construction footprints.  
9 Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and*  
10 *Implement Hazardous Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention,*  
11 *Containment, and Countermeasure Plans*; and EC-14: *Construction Best Management Practices for*  
12 *Biological Resources* (Appendix 3B) would reduce these potential impacts by training construction  
13 staff on protecting sensitive biological resources, reporting requirements, and the ramifications for  
14 not following these measures; implementing spill prevention and containment plans that would  
15 avoid material spills that could affect the viability of habitats; and having a biological monitor  
16 present to ensure that non-disturbance buffers and associated construction fencing are intact and all  
17 other protective measures are being implemented where applicable.

#### 18 Operations

19 None of the project alternatives would result in operational impacts on biological resources  
20 identified for protection in local policies and ordinances because operating conveyance facilities  
21 would not involve disturbance or removal of wetlands, trees, or species habitat.

#### 22 Maintenance

23 None of the project alternatives would result in impacts on biological resources identified for  
24 protection in local policies and ordinances resulting from maintenance activities because even  
25 though some vegetation management would occur, it would be limited to mowing of grasses and  
26 trimming of shrubs and trees planted within DWR facilities and not removal of habitats or protected  
27 trees.

#### 28 **CEQA Conclusion—All Project Alternatives**

29 Construction of all project alternatives would result in impacts on biological resources identified for  
30 protection in local policies and ordinances through the permanent and temporary loss of wetlands,  
31 riparian, and habitat for special-status species.

32 The temporary loss of habitats from project construction would be reduced by Environmental  
33 Commitments EC-1: *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous*  
34 *Materials Management Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and*  
35 *Countermeasure Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
36 (Appendix 3B). Even with these commitments, however, the permanent loss of habitat from the  
37 construction of the alternatives would be significant. The implementation of the CMP would be  
38 required to offset the loss of wetlands, riparian, and habitat for special-status species (Appendix 3F),  
39 which would reduce impacts on these resources and thus the conflicts with local policies and  
40 ordinances to less than significant.

## 1           **Mitigation Measure CMP: Compensatory Mitigation Plan**

2           The CMP that DWR will implement (see Impact BIO-1 for a summary discussion of the CMP) will  
3           result in creation and protection of wetlands, riparian, and habitat for special-status species on  
4           Bouldin Island and at the I-5 ponds in San Joaquin County and the purchase mitigation bank  
5           credits for vernal pool fairy shrimp, vernal pool tadpole shrimp, California tiger salamander, and  
6           California red-legged frog, which likely would take place in Contra Costa, Alameda, or San  
7           Joaquin County (Appendix 3F).

## 8           ***Mitigation Impacts***

### 9           *Compensatory Mitigation*

10          The creation and enhancement of wetlands and other waters, as well as habitat for special-status  
11          species on Bouldin Island and at the I-5 ponds, tidal wetland habitat restoration, channel margin  
12          enhancement, non-bank habitat creation, and site protection instruments under the project's CMP,  
13          would affect biological resources identified for protection in local policies and ordinances through  
14          the removal of trees and temporary disturbances to habitat and the displacement of wildlife.  
15          Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-3: *Develop and*  
16          *Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14: *Construction Best*  
17          *Management Practices for Biological Resources* (Appendix 3B) would reduce these potential impacts  
18          by training construction staff on protecting sensitive biological resources, reporting requirements,  
19          and the ramifications for not following these measures; implementing spill prevention and  
20          containment plans that would avoid material spills that could affect the viability of habitats; and  
21          having a biological monitor present to ensure that non-disturbance buffers and associated  
22          construction fencing are intact and all other protective measures are being implemented where  
23          applicable.

24          The impact on local policies and ordinances from the project with the CMP would be less than  
25          significant.

### 26          *Other Mitigation Measures*

27          Some other mitigation measures may cause impacts on terrestrial biological resources identified for  
28          protection in goals and polices of general plans and ordinances for local jurisdictions overlapping  
29          with the project footprint. Impacts may be caused by activities such as grading, excavations,  
30          dredging, fill, and construction of structures. Impacts of these measures may include habitat  
31          degradation, habitat loss, ground disturbances and noise that may cause disruption of normal  
32          wildlife behaviors, hydrological changes, altered drainage patterns, and sedimentation which may  
33          affect habitat for covered special-status species, natural communities, and aquatic resources.  
34          Impacts would be similar to construction effects of the project alternatives on terrestrial biological  
35          resources identified for protection in goals and polices of general plans and ordinances for local  
36          jurisdictions overlapping with the project footprint.

37          These impacts would be reduced through the CMP, Environmental Commitments EC-1: *Conduct*  
38          *Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*;  
39          EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; and EC-14:  
40          *Construction Best Management Practices for Biological Resources*. Therefore, impacts on general  
41          plans and ordinances for local jurisdictions overlapping with the project footprint from other  
42          mitigation measures would be reduced to less than significant.

1 Overall, the impacts on general plans and ordinances for local jurisdictions overlapping with the  
 2 project footprint from construction of compensatory mitigation and implementation of other  
 3 mitigation measures, combined with project alternatives, would not change the less than significant  
 4 with mitigation impact conclusion.

5 **Impact BIO-56: Substantial Adverse Effects on Fish and Wildlife Resources Regulated under**  
 6 **California Fish and Game Code Section 1600 *et seq.***

7 The methods for the analysis of effects on rivers, streams, and lakes, including associated  
 8 communities, regulated under California Fish and Game Code Section 1600 *et seq.*, and the fish,  
 9 wildlife, and plant species that use such aquatic habitats and associated communities, appear in  
 10 Section 13.3.1.2. Information on these resources in the study area is presented in Section 13.1. The  
 11 analysis below includes an assessment of project activities that may substantially divert or obstruct  
 12 the natural flow of, or substantially change or use any material from the bed, channel, or bank of,  
 13 any river, stream, or lake; or deposit or dispose of debris, waste, or other material into any river,  
 14 stream, or lake. Where the aforementioned activities have a potential to occur, a quantitative  
 15 analysis has been conducted of impacts associated with the construction and operation (fish only) of  
 16 the alternatives on these resources, associated communities, and on fish and wildlife resources, as  
 17 well as special-status plants, that use these rivers, streams, and lakes as habitat. With respect to  
 18 operations and maintenance effects on plants and wildlife, a qualitative analysis of impacts on these  
 19 resources is included below.

20 ***All Project Alternatives***

21 *Construction*

22 The construction activities associated with each of the alternatives would occur within rivers,  
 23 streams, and lakes, including communities associated with these resources, subject to notification  
 24 requirements under California Fish and Game Code Section 1600 *et seq.* These construction  
 25 activities would result in the conversion and degradation of rivers, streams, and lakes, including  
 26 aquatic and associated communities that support fish, wildlife, and plant species.

27 Rivers, streams, and lakes would be permanently affected primarily by the construction of the  
 28 intakes (all alternatives), the Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c), and new  
 29 transmission line construction (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) (Table 13-104). The full  
 30 list of potential sources of impacts are included in Appendix 13C. The permanent impacts on rivers  
 31 would include the placement of the intake fish screens and supporting infrastructure (e.g., riprap,  
 32 cement, steel) within the bed and banks of the Sacramento River and the placement of rock and  
 33 cement in the bed and bank of the Italian Slough to support the Southern Forebay emergency  
 34 spillway and access road crossings (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c). Long-term  
 35 temporary impacts (those greater than 1 year) would primarily be associated with intake  
 36 construction (all alternatives) and the construction of the Bethany Complex (Alternative 5).

37 **Table 13-104. Estimated Impacts on Rivers, Streams, and Lakes and Associated Communities**  
 38 **Potentially Regulated under California Fish and Game Code 1600 *et seq.* (permanent, long-term**  
 39 **temporary, and temporary acres combined)**

	Alt. 1	Alt. 2a	Alt. 2b	Alt. 2c	Alt. 3	Alt. 4a	Alt. 4b	Alt. 4c	Alt. 5
<b>Rivers, Streams, And Lakes (Includes Wetlands Falling within the Bed, Bank, and Channel)</b>									
Nontidal perennial aquatic	1.39	1.89	1.29	1.39	0.51	1.01	0.41	0.51	1.73

	Alt. 1	Alt. 2a	Alt. 2b	Alt. 2c	Alt. 3	Alt. 4a	Alt. 4b	Alt. 4c	Alt. 5
Tidal freshwater emergent wetland	2.94	2.76	2.76	2.76	1.64	1.64	1.64	1.64	1.98
Tidal perennial aquatic	52.75	53.93	48.94	51.51	35.87	37.55	32.55	35.13	22.39
Nontidal freshwater perennial emergent wetland	1.54	1.54	0.52	1.54	1.76	1.76	0.74	1.76	1.6
Rivers, Streams, and Lakes Subtotal	58.62	60.12	53.51	57.20	39.78	41.96	35.34	39.04	27.70
<b>Associated Communities <sup>a</sup></b>									
Agricultural	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Developed	4.81	4.81	4.81	4.81	4.35	4.35	4.35	4.35	2.74
Grassland	25.82	25.79	25.79	25.75	1.98	1.98	1.98	1.93	2.48
Valley/foothill riparian	16.92	19.43	14.56	16.20	16.70	19.47	14.60	16.23	17.06
Vernal pool complex	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.00
Associated Communities Subtotal	47.70	50.18	45.31	46.91	23.18	25.95	21.08	22.66	22.33
Total	106.32	110.30	98.82	104.11	62.96	67.91	56.42	61.70	50.03

1 Alt. = Alternative.

2 <sup>a</sup> Includes all land cover up to the top of bank and areas associated with or dependent upon adjacent rivers, streams, or  
3 lakes.

4 Construction impacts on fish species occurring in rivers and streams are discussed in detail in  
5 Chapter 12, *Fish and Aquatic Resources*, Impact AQUA-1: *Effects of Construction of Water Conveyance*  
6 *Facilities on Fish and Aquatic Species*. Special-status wildlife and plant species associated with rivers,  
7 streams, and lakes that would be affected are summarized in Table 13-105. The impacts on species  
8 would include loss of habitat, disturbance to habitat, injury, mortality, and disruption of normal  
9 behaviors. Associated communities, including habitat for fish, wildlife, and plant species, would be  
10 permanently affected by the construction of intakes (all alternatives), levee improvements  
11 (Alternatives 1, 2a, 2b, and 2c), and new transmission line construction (Alternatives 1, 2a, 2b, 2c, 3,  
12 4a, 4b, and 4c) (Tables 13-104 and 13-105). The full list of potential sources of impacts are included  
13 in Appendix 13C.

14 Temporary impacts (those occurring for less than one year) on rivers, streams, and lakes, associated  
15 communities, and species would largely result from geotechnical work (all alternatives) and road  
16 construction (greatest for Alternatives 1, 2a, 2b, and 2c). The geotechnical work would involve some  
17 in-channel borings that would require use of bed materials and the deposit of grout to backfill these  
18 borings and would result in the temporary disturbance to associated communities (more detail on  
19 geotechnical work is provided below). Environmental Commitments EC-1: *Conduct Worker*  
20 *Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3:  
21 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-4a: *Develop and*  
22 *Implement Erosion and Sediment Control Plans*; EC-4b: *Develop and Implement Stormwater Pollution*  
23 *Prevention Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
24 (Appendix 3B) would minimize potential impacts on rivers, streams, and lakes as well as associated  
25 communities and fish, wildlife, and plant species. These measures would ensure that (1)  
26 construction staff receive sufficient training regarding requirements concerning the protection of  
27 rivers, streams, lakes, and associated communities; (2) hazardous materials, spill prevention,  
28 erosion, sediment, and stormwater pollution plans are properly implemented to ensure that  
29 hazardous materials, sediment, and other materials are not transported from construction sites to  
30 rivers, streams, and lakes; (3) in-water work windows would limit temporal overlap of fish and  
31 aquatic habitats with construction activities, particularly for listed species such as migrating  
32 salmonids; and (4) a biological monitor is present to ensure that non-disturbance buffers and

1 associated construction fencing remain intact and that all other protective measures are being  
2 properly implemented, where applicable.

3 Field investigations for each alternative would be conducted prior to and during construction and  
4 would involve a variety of ground-disturbing activities (Section 3.15), which could result in direct  
5 impacts on biological resources potentially subject to regulation under California Fish and Game  
6 Code Section 1600 *et seq.* Geotechnical investigations associated with the West Tracy Fault and the  
7 tunnels for all of the alternatives, which include test trenches, CPTs, and soil borings, would result in  
8 temporary impacts on rivers, streams, and lakes, associated communities, and species, which are  
9 included in the impact totals in Tables 13-104 and 13-105. Specific impacts related to West Tracy  
10 Fault and geotechnical investigations over the tunnels are described in Appendix 13C. Field  
11 investigations within proposed surface construction footprints (including portions of tunnel  
12 alignments), which include test trenches, CPTs, soil borings, ERT, groundwater testing and  
13 monitoring, monument installation, pilot studies for settlement, agronomic testing, and utility  
14 potholing, would temporarily affect habitats. These temporary impacts are not characterized as an  
15 additional loss of habitat because impacts for these locations have already been quantified within  
16 the construction footprints. Environmental Commitments EC-1: *Conduct Worker Awareness*  
17 *Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*; EC-3: *Develop and*  
18 *Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-4a: *Develop and Implement*  
19 *Erosion and Sediment Control Plan*; EC-4b: *Develop and Implement Storm Water Pollution Prevention*  
20 *Plans*; and EC-14: *Construction Best Management Practices for Biological Resources* (Appendix 3B)  
21 would reduce potential impacts by (1) training construction staff on protecting rivers, streams, and  
22 lakes and special-status species habitat, and the ramifications for not following protective measures;  
23 (2) implementing hazardous material, spill prevention, erosion, sediment, and stormwater pollution  
24 plans to ensure that construction sites do not result in the transport of sediment and other materials  
25 into rivers, streams, and lakes or alter the hydrology of these features; and (3) having a biological  
26 monitor present to ensure that non-disturbance buffers and associated construction fencing are  
27 intact and all other protective measures are being implemented would ensure that impacts caused  
28 by field investigations to rivers, streams, and lakes including associated fish and wildlife species,  
29 would be minimized.



1 **Table 13-105. Estimated Impacts on Species Habitat Potentially Regulated under California Fish and Game Code 1600 et seq. (permanent,**  
 2 **long-term temporary, and temporary acres combined)**

Species	Habitat	Alt. 1	Alt. 2a	Alt. 2b	Alt. 2c	Alt. 3	Alt. 4a	Alt. 4b	Alt. 4c	Alt. 5
Alkali milk-vetch, spiny-sepaed button-celery, saline clover	Modeled	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.00
Brittlescale, recurved larkspur, Heckard's peppergrass	Modeled	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.00
Watershield	Modeled	1.49	1.99	1.38	1.49	0.56	1.06	0.45	0.56	1.79
Bristly sedge	Modeled	3.53	3.43	2.24	3.18	3.16	3.16	1.97	2.91	3.24
Bolander's water-hemlock	Modeled	0.56	0.55	0.55	0.55	0.38	0.38	0.38	0.38	0.29
San Joaquin spearscale	Modeled	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	1.24
Woolly rose-mallow	Modeled	0.08	0.07	0.07	0.07	0.16	0.16	0.16	0.16	0.07
Delta tule pea	Modeled	29.63	30.68	27.65	29.29	6.64	7.75	4.73	6.36	5.93
Mason's lilaepsis, Delta mudwort	Modeled	5.83	6.06	5.27	5.69	3.42	3.71	2.92	3.33	2.13
Shining navarretia, caper-fruited tropidocarpum	Modeled	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.24
Eel-grass pondweed	Modeled	2.92	3.42	1.81	2.92	2.27	2.77	1.15	2.27	3.34
California alkali grass, long-styled sand-spurry	Modeled	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.00
Sanford's arrowhead	Modeled	0.77	0.63	0.63	0.63	0.79	0.79	0.79	0.79	0.93
Marsh skullcap, side-flowering skullcap	Modeled	1.05	1.01	1.01	1.04	0.58	0.58	0.58	0.62	0.51
Suisun marsh aster	Modeled	30.85	31.86	28.86	30.33	6.45	7.53	4.53	6.01	5.80
Valley elderberry longhorn beetle	Total	42.74	45.22	40.35	41.95	18.73	21.50	16.63	18.21	19.59
Valley elderberry longhorn beetle	Riparian	16.92	19.43	14.56	16.20	16.70	19.47	14.60	16.23	17.06
Valley elderberry longhorn beetle	Non-riparian	25.82	25.79	25.79	25.75	2.03	2.03	2.03	1.98	2.53
Curved-foot hygrotus diving beetle	Modeled	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.33
Molestan blister beetle, blennosperma vernal pool andrenid bee	Modeled	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.00
Crotch and western bumblebees	Modeled	25.92	25.89	25.89	25.85	2.08	2.08	2.08	2.03	2.48
California tiger salamander	Upland	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	1.24
California red-legged frog	Total	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	0.23
California red-legged frog	Aquatic	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	0.23

Species	Habitat	Alt. 1	Alt. 2a	Alt. 2b	Alt. 2c	Alt. 3	Alt. 4a	Alt. 4b	Alt. 4c	Alt. 5
California red-legged frog	Upland	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.00
Western pond turtle	Total	101.61	105.60	94.12	99.40	58.71	63.65	52.17	57.46	47.32
Western pond turtle	Aquatic	58.77	60.27	53.66	57.35	39.93	42.11	35.50	39.19	27.78
Western pond turtle	Upland	42.84	45.33	40.46	42.05	18.78	21.54	16.67	18.27	19.54
Coast horned lizard	Modeled	24.09	25.27	23.95	24.31	5.88	7.12	5.80	6.16	5.35
California legless lizard	Modeled	21.82	21.77	21.77	21.77	2.96	2.96	2.96	2.96	2.41
San Joaquin coachwhip	Modeled	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	1.24
Giant garter snake	Total	56.93	59.99	52.13	55.70	29.08	32.75	24.88	28.46	25.65
Giant garter snake	Aquatic	14.63	15.35	12.21	14.20	11.40	12.45	9.31	11.30	8.67
Giant garter snake	Upland	42.30	44.64	39.92	41.50	17.68	20.30	15.57	17.16	16.98
Western yellow-billed cuckoo, yellow warbler, least Bell's vireo	Modeled	8.24	9.95	6.44	7.68	8.45	10.21	6.70	7.95	8.56
California black rail	Total	4.04	4.04	3.02	4.04	3.06	3.06	2.04	3.06	3.02
California black rail	California black rail in-channel island primary	2.17	2.17	2.17	2.17	1.04	1.04	1.04	1.04	1.24
California black rail	California black rail in-channel island secondary	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
California black rail	Delta	1.87	1.87	0.85	1.87	2.02	2.02	1.00	2.02	1.78
Greater sandhill crane	Foraging	25.02	24.98	24.98	24.93	0.87	0.87	0.87	0.82	0.84
Lesser sandhill crane	Foraging	24.99	24.96	24.96	24.92	1.38	1.38	1.38	1.33	1.18
California least tern	Foraging	52.75	53.93	48.94	51.51	35.87	37.55	32.55	35.13	22.39
Double-crested cormorant, great blue heron, great egret	Modeled	16.84	19.37	14.50	16.14	16.29	19.05	14.18	15.82	16.64
Least bittern	Modeled	4.47	4.29	3.27	4.29	3.40	3.40	2.38	3.40	3.58
Snowy egret, black-crowned night heron	Nesting and foraging	21.28	23.63	17.74	20.40	19.65	22.41	16.52	19.18	20.22
Osprey	Total	65.85	70.06	59.96	63.91	48.96	53.90	43.80	47.75	37.03
Osprey	Nesting	11.62	14.15	9.64	10.92	12.56	15.32	10.81	12.09	12.88
Osprey	Foraging	54.23	55.91	50.32	52.99	36.40	38.58	32.99	35.66	24.15
White-tailed kite	Total	20.12	22.47	16.94	19.24	15.96	18.72	13.19	15.49	16.46
White-tailed kite	Nesting	11.62	14.15	9.64	10.92	12.56	15.32	10.81	12.09	12.88
White-tailed kite	Foraging	8.50	8.32	7.30	8.32	3.40	3.40	2.38	3.40	3.58
Northern harrier	Nesting and foraging	8.50	8.32	7.30	8.32	3.40	3.40	2.38	3.40	3.58

Species	Habitat	Alt. 1	Alt. 2a	Alt. 2b	Alt. 2c	Alt. 3	Alt. 4a	Alt. 4b	Alt. 4c	Alt. 5
Coopers hawk	Nesting	16.80	19.34	14.47	16.10	16.25	19.01	14.14	15.78	16.64
Swainson's hawk	Total	36.34	38.84	34.33	35.61	13.70	16.46	11.95	13.23	13.30
Swainson's hawk	Nesting	11.62	14.15	9.64	10.92	12.56	15.32	10.81	12.09	12.66
Swainson's hawk	Foraging	24.72	24.69	24.69	24.69	1.14	1.14	1.14	1.14	0.64
Burrowing owl	Total	25.97	25.94	25.94	25.90	2.18	2.18	2.18	2.13	2.58
Burrowing owl	High value nesting and foraging	25.92	25.89	25.89	25.85	2.08	2.08	2.08	2.03	2.48
Burrowing owl	Low value nesting and foraging	0.05	0.05	0.05	0.05	0.10	0.10	0.10	0.10	0.10
Short-eared owl	Nesting and foraging	8.50	8.32	7.30	8.32	3.40	3.40	2.38	3.40	3.58
Loggerhead shrike	Nesting and foraging	28.24	28.24	28.20	28.38	5.04	5.08	5.04	5.22	5.66
California horned lark, grasshopper sparrow, ferruginous hawk,	Modeled	25.92	25.89	25.89	25.85	2.08	2.08	2.08	2.03	2.48
Modesto song sparrow	Nesting and foraging	21.39	23.72	17.84	20.49	20.10	22.86	16.98	19.63	20.64
Yellow-breasted chat	Modeled	16.41	17.95	14.41	15.69	16.23	18.02	14.48	15.76	16.62
Yellow-headed blackbird	Total	30.39	30.18	29.16	30.14	5.48	5.48	4.46	5.43	6.06
Yellow-headed blackbird	Nesting	4.47	4.29	3.27	4.29	3.40	3.40	2.38	3.40	3.58
Yellow-headed blackbird	Foraging	25.92	25.89	25.89	25.85	2.08	2.08	2.08	2.03	2.48
Tricolored blackbird	Total	35.22	35.01	33.99	34.97	8.86	8.86	7.84	8.81	9.52
Tricolored blackbird	Potentially suitable colony	9.30	9.12	8.10	9.12	6.73	6.73	5.71	6.73	6.99
Tricolored blackbird	Foraging	25.92	25.89	25.89	25.85	2.13	2.13	2.13	2.08	2.53
Bats	Total	102.30	106.28	94.79	100.08	59.63	64.59	53.09	58.38	47.79
Bats	Foraging	85.38	86.85	80.23	83.88	42.93	45.12	38.49	42.15	30.73
Bats	Tree roosting and foraging	16.92	19.43	14.56	16.20	16.70	19.47	14.60	16.23	17.06
San Joaquin kit fox	Low quality	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.24
American badger, San Joaquin pocket mouse	Modeled	8.36	8.33	8.33	8.29	1.53	1.53	1.53	1.49	1.94

1 Alt. = Alternative.

1        Operations

2        Project operations would result in the diversion of water from the Sacramento River at the intake  
3        locations. The effects of these diversions would result in impacts on fish, which are discussed in  
4        Chapter 12, but would not likely result in impacts on terrestrial biological resources addressed in  
5        this chapter. The operation of the project would not result in the substantial change or use of  
6        material from the bed, channel, or bank of rivers, streams, and lakes or the deposition of materials  
7        into these resources in the study area subject to notification under Fish and Game Code Section  
8        1600 *et seq.* The effects of operations on surface waters are addressed in Chapter 5, and effects of  
9        operations on water quality are addressed in Chapter 9.

10       Maintenance

11       The maintenance of water conveyance facilities for all project alternatives could result in periodic  
12       impacts on rivers, streams, and lakes in the study area. Maintenance activities across all facilities  
13       that could affect these rivers, streams, and lakes include repaving of access roads every 15 years and  
14       semiannual general and ground maintenance (e.g., mowing, vegetation trimming, herbicide  
15       application) if these activities occur within or adjacent to these rivers, streams, and lakes.  
16       Maintenance at the Southern Forebay (Alternatives 1, 2a, 2b, 2c, 3, 4a, 4b, and 4c) would include  
17       annual embankment repair, which could also result in the potential periodic impacts on this  
18       resource. However, none of these activities would result in diversion or obstruction of natural flows,  
19       or substantially change or use material from the bed, channel, or bank of rivers, streams, or lakes in  
20       the study area, and would also not result in depositing or disposing of debris, waste, or other  
21       material into these features.

22       **CEQA Conclusion—All Project Alternatives**

23       The construction and maintenance of each of the project alternatives would result in the conversion  
24       and degradation of rivers, streams, and lakes and associated communities, subject to the notification  
25       requirements of California Fish and Game Code 1600 *et seq.* Impacts on these resources would  
26       substantially adversely affect fish, wildlife, and plant resources that rely on rivers, streams, lakes,  
27       and associated communities.

28       Impacts on these resources would be avoided and minimized by Environmental Commitments EC-1:  
29       *Conduct Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management*  
30       *Plans*; EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-4a:  
31       *Develop and Implement Erosion and Sediment Control Plans*; EC-4b: *Develop and Implement*  
32       *Stormwater Pollution Prevention Plans*; and EC-14: *Construction Best Management Practices for*  
33       *Biological Resources* (Appendix 3B). However, even with these commitments, the impacts on rivers,  
34       streams, and lakes, related to the diversion, obstruction, and substantial changes to rivers, lakes, and  
35       streams from construction, operation, and maintenance activities of the alternatives would have a  
36       substantial adverse effect on fish and wildlife resources and, consequently, would result in a  
37       significant impact.

38       The CMP, which would create and enhance aquatic resources and habitats for special-status species,  
39       would be required to avoid a significant loss in the overall abundance, diversity, or condition of  
40       rivers, streams, and lakes and substantial adverse effects on fish and wildlife resources, including  
41       rare plants, that depend on rivers, streams, and lakes and associated communities (Appendix 3F),  
42       which would reduce the impacts associated with the loss of habitats to a less-than-significant level.

1 Mitigation Measure BIO-2b: *Avoid and Minimize Impacts on Terrestrial Biological Resources from*  
2 *Maintenance Activities* would be required to avoid and minimize the potential for periodic,  
3 temporary impacts on rivers, streams, and lakes, including fish and wildlife resources, during  
4 maintenance activities. The impacts on these resources would be reduced to less-than-significant  
5 levels because the aforementioned measures would avoid a net loss in rivers, streams, and lakes  
6 and, consequently, habitat used by fish wildlife, and plant resources, by assessing maintenance work  
7 areas for aquatic and associated communities, establishing non-disturbance buffers around these  
8 resources, training maintenance staff on the need to avoid discharging of fill material into rivers,  
9 streams, and lakes, and having a biological monitor present, where applicable. Mitigation Measures  
10 AQUA-1a: *Develop and Implement an Underwater Sound Control and Abatement Plan*, AQUA-1b:  
11 *Develop and Implement a Barge Operations Plan*, AQUA-1c: *Develop and Implement a Fish Rescue and*  
12 *Salvage Plan*, BIO-2a: *Avoid or Minimize Impacts on Special-Status Natural Communities and Special-*  
13 *Status Plants*, BIO-18a: *Avoid and Minimize Impacts on Valley Elderberry Longhorn Beetle*, BIO-22a:  
14 *Avoid and Minimize Impacts on California Tiger Salamander*, BIO-24a: *Avoid and Minimize Impacts on*  
15 *California Red-Legged Frog and Critical Habitat*, BIO-25: *Avoid and Minimize Impacts on Western*  
16 *Pond Turtle*, BIO-26: *Avoid and Minimize Impacts on Special-Status Reptiles*, BIO-30: *Avoid and*  
17 *Minimize Impacts on Giant Garter Snake*, BIO-31: *Avoid and Minimize Impacts on Western Yellow-*  
18 *Billed Cuckoo*, BIO-32: *Conduct Preconstruction Surveys and Implement Protective Measures to Avoid*  
19 *Disturbance of California Black Rail*, BIO-33: *Minimize Disturbance of Sandhill Cranes*, BIO-36a:  
20 *Conduct Nesting Surveys for Special-Status and Non-Special-Status Birds and Implement Protective*  
21 *Measures to Avoid Disturbance of Nesting Birds and Raptors*, BIO-35: *Avoid and Minimize Impacts on*  
22 *Cormorant, Heron, and Egret Rookeries*, BIO-36b: *Conduct Preconstruction Surveys and Implement*  
23 *Protective Measures to Avoid Disturbance of White-Tailed Kite*, BIO-39: *Conduct Preconstruction*  
24 *Surveys and Implement Protective Measures to Minimize Disturbance of Swainson's Hawk*, BIO-40:  
25 *Conduct Surveys and Minimize Impacts on Burrowing Owl*, BIO-44a: *Conduct Preconstruction Surveys*  
26 *and Implement Protective Measures to Avoid Disturbance of Tricolored Blackbird*, BIO-45b: *Avoid and*  
27 *Minimize Impacts on Roosting Bats*, BIO-46: *Conduct Preconstruction Survey for San Joaquin Kit Fox*  
28 *and Implement Avoidance and Minimization Measures*, and BIO-47: *Conduct Preconstruction Survey*  
29 *for American Badger and Implement Avoidance and Minimization Measures* would be required to  
30 avoid and minimize the disturbance to rivers, streams, lakes, associated communities, and habitat  
31 for species, and the potential for injury, mortality, and disruption of normal behaviors. The impacts  
32 on rivers, streams, and lakes, and associated communities, subject to the notification requirements  
33 of California Fish and Game Code 1600 *et seq.* would be less than significant because the  
34 aforementioned measures would provide for compensatory mitigation to offset impacts on habitat  
35 that support fish and wildlife species, including rare plants, and would require steps to avoid and  
36 minimize effects on these species by establishing work windows to minimize the level of  
37 construction activities during sensitive time periods (e.g., migration, nesting), by establishing non-  
38 disturbance buffers to protect sensitive resources, by conducting preconstruction surveys to avoid  
39 occupied areas to the extent practicable, and by having biological monitors present to ensure  
40 measures are implemented and that direct effects on species are avoided and minimized.

#### 41 **Mitigation Measure CMP: Compensatory Mitigation Plan**

42 DWR would implement the CMP (see Impact BIO-1 for a summary discussion of the CMP) to  
43 offset the loss of habitat for fish, wildlife, and plants associated with rivers, lakes, and streams  
44 (Appendix 3F, Sections 3F.3.2 and 3F 3.3, and Attachment 3F.1, Tables 3F.1-2 and 3F.1-3). The  
45 mitigation approach includes initial mitigation actions at specific sites, purchase of mitigation  
46 credits at existing or proposed mitigation banks, and a mitigation framework for future

1 compensatory mitigation actions for tidal habitats. These actions would benefit the special-  
2 status species these activities are targeting as well as provide habitats for common species that  
3 occur in the study area.

4 **Mitigation Measures AQUA-1a: Develop and Implement an Underwater Sound Control and**  
5 **Abatement Plan**

6 See description of Mitigation Measure AQUA-1a under Impact AQUA-1.

7 **Mitigation Measure AQUA-1b: Develop and Implement a Barge Operations Plan**

8 See description of Mitigation Measure AQUA-1b under Impact AQUA-1.

9 **Mitigation Measure AQUA-1c: Develop and Implement a Fish Rescue and Salvage Plan**

10 See description of Mitigation Measure AQUA-1c under Impact AQUA-1.

11 **Mitigation Measure BIO-2a: Avoid or Minimize Impacts on Special-Status Natural**  
12 **Communities and Special-Status Plants**

13 See description of Mitigation Measure BIO-2a under Impact BIO-2.

14 **Mitigation Measure BIO-2b: Avoid and Minimize Impacts on Terrestrial Biological**  
15 **Resources from Maintenance Activities**

16 See description of Mitigation Measure BIO-2b under Impact BIO-2.

17 **Mitigation Measure BIO-18: Avoid and Minimize Impacts on Valley Elderberry Longhorn**  
18 **Beetle**

19 See description of Mitigation Measure BIO-18 under Impact BIO-18.

20 **Mitigation Measure BIO-22a: Avoid and Minimize Impacts on California Tiger Salamander**

21 See description of Mitigation Measure BIO-22a under Impact BIO-22.

22 **Mitigation Measure BIO-24a: Avoid and Minimize Impacts on California Red-Legged Frog**  
23 **and Critical Habitat**

24 See description of Mitigation Measure BIO-24a under Impact BIO-24.

25 **Mitigation Measure BIO-25: Avoid and Minimize Impacts on Western Pond Turtle**

26 See description of Mitigation Measure BIO-25 under Impact BIO-25.

27 **Mitigation Measure BIO-26: Avoid and Minimize Impacts on Special-Status Reptiles**

28 See description of Mitigation Measure BIO-26 under Impact BIO-26.

29 **Mitigation Measure BIO-30: Avoid and Minimize Impacts on Giant Garter Snake**

30 See description of Mitigation Measure BIO-30 under Impact BIO-30.

1           **Mitigation Measure BIO-31: Avoid and Minimize Impacts on Western Yellow-Billed**  
2           **Cuckoo**

3           See description of Mitigation Measure BIO-31 under Impact BIO-31.

4           **Mitigation Measure BIO-32: Conduct Preconstruction Surveys and Implement Protective**  
5           **Measures to Avoid Disturbance of California Black Rail**

6           See description of Mitigation Measure BIO-32 under Impact BIO-32.

7           **Mitigation Measure BIO-33: Minimize Disturbance of Sandhill Cranes**

8           See description of Mitigation Measure BIO-33 under Impact BIO-33.

9           **Mitigation Measure BIO-35: Avoid and Minimize Impacts on Cormorant, Heron, and Egret**  
10          **Rookeries**

11          See description of Mitigation Measure BIO-35 under Impact BIO-35.

12          **Mitigation Measure BIO-36a: Conduct Nesting Surveys for Special-Status and Non-Special-**  
13          **Status Birds and Implement Protective Measures to Avoid Disturbance of Nesting Birds**  
14          **and Raptors**

15          See description of Mitigation Measure BIO-36a under Impact BIO-36.

16          **Mitigation Measure BIO-36b: Conduct Preconstruction Surveys and Implement Protective**  
17          **Measures to Avoid Disturbance of White-Tailed Kite**

18          See description of Mitigation Measure BIO-36b under Impact BIO-36.

19          **Mitigation Measure BIO-39: Conduct Preconstruction Surveys and Implement Protective**  
20          **Measures to Minimize Disturbance of Swainson's Hawk**

21          See description of Mitigation Measure BIO-39 under Impact BIO-39.

22          **Mitigation Measure BIO-40: Conduct Surveys and Minimize Impacts on Burrowing Owl**

23          See description of Mitigation Measure BIO-40 under Impact BIO-40.

24          **Mitigation Measure BIO-44: Conduct Preconstruction Surveys and Implement Protective**  
25          **Measures to Avoid Disturbance of Tricolored Blackbird**

26          See description of Mitigation Measure BIO-44 under Impact BIO-44.

27          **Mitigation Measure BIO-45b: Avoid and Minimize Impacts on Roosting Bats**

28          See description of Mitigation Measure BIO-45b under Impact BIO-45.

29          **Mitigation Measure BIO-46: Conduct Preconstruction Survey for San Joaquin Kit Fox and**  
30          **Implement Avoidance and Minimization Measures**

31          See description of Mitigation Measure BIO-46 under Impact BIO-46.

1           **Mitigation Measure BIO-47: Conduct Preconstruction Survey for American Badger and**  
2           **Implement Avoidance and Minimization Measures**

3           See description of Mitigation Measure BIO-47 under Impact BIO-47.

4           ***Mitigation Impacts***

5           As discussed in Chapter 4, Section 4.1.1.5, *Mitigation Approaches*, CEQA requires an evaluation of  
6           mitigation measure impacts. The analyses below consider the potential impacts associated with  
7           implementing the CMP and other mitigation measures. Methods for these analyses are presented in  
8           Sections 13.3.1.5, *Evaluation of Compensatory Mitigation*, and 13.3.1.6, *Evaluation of Other Mitigation*  
9           *Measures*.

10          *Compensatory Mitigation*

11          The creation and enhancement of aquatic resources, as well as habitat for special-status species  
12          under the CMP (Appendix 3F), on Bouldin Island and at the I-5 ponds would result in the permanent  
13          and temporary discharges of fill material into existing aquatic habitat, specifically lakes (nontidal  
14          perennial aquatic) and associated communities that include habitats for plant and wildlife species  
15          (Appendix 13C), from grading to create the appropriate topography and soil conditions to establish  
16          and enhance habitats. The CMP also includes a framework for channel margin enhancement and  
17          tidal wetland habitat creation. The activities to enhance channel margins would generally include  
18          removal of existing riprap, modification of the existing channel margin with heavy equipment, and  
19          placement of large woody debris on the channel margin, which would result in the permanent and  
20          temporary alteration of the banks and beds of Delta channels. Channel margin enhancement sites  
21          would be targeted within the same general geography of the project, including the north Delta along  
22          the Sacramento River mainstem, north Delta along Sacramento River tributaries (e.g., Steamboat,  
23          Sutter, and Elk Sloughs), lower Yolo Bypass, and Cache Slough Complex. Tidal restoration activities  
24          would include grading, creating setback levees, planting, and breaching of existing levees. These  
25          tidal restoration and channel margin enhancement activities could result in impacts on fish and  
26          wildlife, including rare plants, which would include the conversion of habitat and the potential for  
27          injury, mortality, and the disruption of normal behaviors. Potential areas for tidal restoration would  
28          be within the lower Yolo Bypass and Cache Slough Complex.

29          In the event that non-bank sites are used for vernal pool or alkaline wetland creation or  
30          enhancement (Appendix 3F, Section 3F.3.2.4), these activities would not substantially divert or  
31          obstruct the natural flow of, or substantially change or use any material from the bed, channel, or  
32          bank of, any river, stream, or lake; or deposit or dispose of debris, waste, or other material into any  
33          river, stream, or lake. Site-specific analyses are not provided because locations of potential non-  
34          bank sites are not currently known.

35          Site protection instruments (e.g., conservation easements, deed restrictions) for greater sandhill  
36          crane, Swainson's hawk, and tricolored blackbird would primarily consist of the protection and  
37          management of agricultural areas but may also include natural communities in the study area  
38          (Appendix 3F, Section 3F.4.2.2, Attachment 3F.1, Table 3F.1-3, CMP-18a: *Sandhill Crane Roosting*  
39          *Habitat*, CMP-18b: *Sandhill Crane Foraging Habitat*, CMP-19a: *Swainson's Hawk Nesting Habitat*,  
40          CMP-19b: *Swainson's Hawk Foraging Habitat*, CMP-22a: *Tricolored Blackbird Nesting Habitat*, and  
41          CMP-22b: *Tricolored Blackbird Foraging Habitat*). These areas may contain streams, rivers, or lakes  
42          but management activities on these properties would continue existing or similar cropping activities  
43          and natural communities would be protected as they are under baseline conditions with no physical



1 changes to habitats. Site-specific analyses are not provided because locations of potential protection  
2 instruments are not currently known.

3 As stated in CMP Section 3F.4, *Mitigation Work Plan*, the compensatory mitigation actions at Bouldin  
4 Island would be designed to provide compensatory mitigation for aquatic resources under both  
5 federal and state mitigation standards and ensures a net gain in aquatic resources, accounting for  
6 any conversions of existing aquatic resources (e.g., agricultural ditches converted to freshwater  
7 emergent wetland). Environmental Commitments EC-1: *Conduct Worker Awareness Training*; EC-3:  
8 *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-4a: *Develop and*  
9 *Implement Erosion and Sediment Control Plan*; EC-4b: *Develop and Implement Storm Water Pollution*  
10 *Prevention Plans*; and EC-14: *Construction Best Management Practices for Biological Resources*  
11 (Appendix 3B) would reduce the potential temporary impact on rivers, streams, and lakes by (1)  
12 training construction staff on protecting rivers, streams, and lakes and the ramifications for not  
13 following protective measures; (2) implementing spill prevention, erosion, sediment, and  
14 stormwater pollution plans to ensure that grading for sites do not result in the transport of sediment  
15 and other materials into adjacent rivers, streams, and lakes; and (3) having a biological monitor  
16 present to ensure that non-disturbance buffers and associated construction fencing are intact and all  
17 other protective measures are being implemented where applicable.

18 The impact on rivers, streams, lakes, associated communities, and species potentially subject to  
19 regulation under California Fish and Game Code 1600 *et seq.* from the project alternatives with the  
20 CMP would be less than significant with mitigation.

#### 21 *Other Mitigation Measures*

22 Some other mitigation measures may cause impacts on resources regulated under California Fish  
23 and Game Code Section 1600 *et seq.* Impacts may be caused by activities such as grading,  
24 excavations, dredging, fill, construction of structures, placement and salvage of topsoil, plantings,  
25 irrigation system installation, and construction of swales. Impacts of these measures may include  
26 habitat degradation, habitat loss, ground disturbances, and noise that may cause disruption of  
27 normal wildlife behaviors, hydrological changes, altered drainage patterns, and sedimentation,  
28 which may affect rivers, streams, lakes, associated communities, and habitat for special-status  
29 species. Impacts would be similar to construction effects of the project alternatives on resources  
30 regulated under California Fish and Game Code Section 1600 *et seq.*

31 These impacts would be reduced through the CMP; Environmental Commitments EC-1: *Conduct*  
32 *Worker Awareness Training*; EC-2: *Develop and Implement Hazardous Materials Management Plans*;  
33 EC-3: *Develop and Implement Spill Prevention, Containment, and Countermeasure Plans*; EC-4a:  
34 *Develop and Implement Erosion and Sediment Control Plan*; EC-4b: *Develop and Implement Storm*  
35 *Water Pollution Prevention Plans*; and EC-14: *Construction Best Management Practices for Biological*  
36 *Resources*; and Mitigation Measures AQUA-1a: *Develop and Implement an Underwater Sound Control*  
37 *and Abatement Plan*; AQUA-1b: *Develop and Implement a Barge Operations Plan*; AQUA-1c: *Develop*  
38 *and Implement a Fish Rescue and Salvage Plan*; BIO-2a: *Avoid or Minimize Impacts on Special-Status*  
39 *Natural Communities and Special-Status Plants*; BIO-2b: *Avoid and Minimize Impacts on Terrestrial*  
40 *Biological Resources from Maintenance Activities*; BIO-18a: *Avoid and Minimize Impacts on Valley*  
41 *Elderberry Longhorn Beetle*; BIO-22a: *Avoid and Minimize Impacts on California Tiger Salamander*;  
42 BIO-24a: *Avoid and Minimize Impacts on California Red-Legged Frog and Critical Habitat*; BIO-25:  
43 *Avoid and Minimize Impacts on Western Pond Turtle*; BIO-26: *Avoid and Minimize Impacts on Special-*  
44 *Status Reptiles*; BIO-30: *Avoid and Minimize Impacts on Giant Garter Snake*; BIO-31: *Avoid and*

1 *Minimize Impacts on Western Yellow-Billed Cuckoo; BIO-32: Conduct Preconstruction Surveys and*  
2 *Implement Protective Measures to Avoid Disturbance of California Black Rail; BIO-33: Minimize*  
3 *Disturbance of Sandhill Cranes; Conduct Nesting Surveys for Special-Status and Non-Special-Status*  
4 *Birds and Implement Protective Measures to Avoid Disturbance of Nesting Birds and Raptors; BIO-35:*  
5 *Avoid and Minimize Impacts on Cormorant, Heron, and Egret Rookeries; BIO-36b: Conduct*  
6 *Preconstruction Surveys and Implement Protective Measures to Avoid Disturbance of White-Tailed*  
7 *Kite; BIO-39: Conduct Preconstruction Surveys and Implement Protective Measures to Minimize*  
8 *Disturbance of Swainson's Hawk; BIO-40: Conduct Surveys and Minimize Impacts on Burrowing Owl;*  
9 *BIO-44a: Conduct Preconstruction Surveys and Implement Protective Measures to Avoid Disturbance of*  
10 *Tricolored Blackbird; BIO-45b: Avoid and Minimize Impacts on Roosting Bats; BIO-46: Conduct*  
11 *Preconstruction Survey for San Joaquin Kit Fox and Implement Avoidance and Minimization Measures;*  
12 *BIO-47: Conduct Preconstruction Survey for American Badger and Implement Avoidance and*  
13 *Minimization Measures.* Therefore, impacts on fish and wildlife resources regulated under California  
14 Fish and Game Code Section 1600 *et seq.* from implementation of other mitigation measures would  
15 be reduced to less than significant.

16 Overall, the impacts on rivers, streams, lakes, and fish and wildlife resources regulated under  
17 California Fish and Game Code Section 1600 *et seq.* from construction of compensatory mitigation  
18 and implementation of other mitigation measures, combined with project alternatives, would not  
19 change the impact conclusion of less than significant with mitigation.

## 20 **13.3.4 Cumulative Analysis**

### 21 **13.3.4.1 Methodology**

22 The cumulative effects analysis for terrestrial biological resources addresses the potential for the  
23 project alternatives to act in combination with other past, present, and reasonably foreseeable  
24 future projects, programs, or conditions to create a cumulatively significant adverse impact. The  
25 analysis also considers whether any incremental effect of an alternative is cumulatively  
26 considerable. Chapter 4, *Framework for the Environmental Analysis*, Section 4.1.1.6, *Cumulative*  
27 *Impacts*, provides the regulatory and statutory basis for the cumulative analyses found in this Draft  
28 EIR.

29 The geographic scope of the analysis for natural communities, including regulated wetlands and  
30 waters, is the terrestrial biology study area and lands immediately adjacent to this study area where  
31 past, present, or reasonably foreseeable activities might indirectly affect the natural communities in  
32 the study area. While the natural communities extend beyond these boundaries, the focus of the  
33 actions that might affect these resources is the Delta. The geographic scope of the cumulative  
34 analysis for each of the species varies, depending on the potential for other projects or programs to  
35 influence individuals that rely on the study area for some stage of their life history. For some wildlife  
36 species, such as migratory birds, this area includes their entire range within California. For other  
37 species whose individuals do not range beyond the study area and its immediate surroundings, the  
38 geographic range of the cumulative analysis has been limited to this smaller area. The geographic  
39 scope for cumulative effects from spread of invasive species is the study area. The geographic scope  
40 for cumulative effects from impacts on wildlife connectivity includes the study area and all areas in  
41 the following counties: Sacramento, San Joaquin, Santa Clara, Alameda, Contra Costa, Solano, and  
42 Napa.

1 The projects and programs that have been considered as part of the cumulative analysis have been  
 2 drawn primarily from a list developed for this Draft EIR and contained in Appendix 3C, *Defining*  
 3 *Existing Conditions, No Project Alternative, and Cumulative Impact Conditions*. The list of past,  
 4 present, and reasonably foreseeable future projects and programs has been evaluated to determine  
 5 which of these activities may have impacts on terrestrial habitats and terrestrial species that are  
 6 known to occur within the study area. The list of projects and programs relevant to terrestrial  
 7 biological resources is contained in Table 13-106.

8 **Table 13-106. Cumulative Impacts on Terrestrial Biological Resources from Plans, Policies, and**  
 9 **Programs**

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
East Alameda County Conservation Strategy	Alameda County	Ongoing	The East Alameda County Conservation Strategy (EACCS) is intended to preserve endangered species with a plan for long-term habitat protection. The EACCS will assess the conservation value of East Alameda County to establish biological principles for conservation in that area. The EACCS will provide a framework for regional conservation of biological species, streamline the environmental permitting process, provide guidance to project proponents, and facilitate ongoing conservation programs. The EACCS will identify land suitable for voluntary mitigation or conservation, mitigation ratios, standards for habitat restorations, best management and maintenance practices for conservation sites, monitoring standards, and guidelines for adaptive management.	Beneficial effects on terrestrial biological resources.
CALFED Levee System Integrity Program	DWR, California Department of Fish and Wildlife, USACE	Ongoing	The CALFED Record of Decision requires that the Levee System Integrity Program be managed to provide for long-term protection for Delta resources through maintenance and improvement of the Delta levee system. Goals are to protect life, infrastructure, and properties and reduce the risk to land use and associated economic activities, water supply, infrastructure, and ecosystem from catastrophic breaching of Delta levees. The primary focus is on the legal Delta as defined in Section 12220 of the California Water Code. Protection and maintenance of 1,300 miles of project and nonproject levees have taken place since the inception of the CALFED Levee System Integrity Program in 2000.	Beneficial effects on a variety of wildlife with potential for impacts on species during activities.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			<p>Other major undertakings include restoration of native vegetation and reuse of dredge material to bolster levee stability.</p> <p>Major activities include levee maintenance, levee improvement, environmental mitigation, emergency response functions, and other components carried out using local funds, with additional funds provided by the state and federal governments. However, uncertainty in program funding has required that some goals be revised and schedules be extended. Proposition 50 provided \$70 million for Delta levees.</p>	
Lower Cache Creek/Woodland Flood Risk Management Project	City of Woodland, USACE, DWR, CVFPB	Planning phase	<p>The Final EIR and Final EIS evaluate impacts associated with a proposed flood risk reduction project on lower Cache Creek. As part of the overall effort, USACE is also preparing a project feasibility study. Similarly, the City of Woodland is partnering with DWR through its Urban Flood Risk Reduction Program to identify and implement the flood risk reduction project to meet the State's urban level of protection requirements in a cost-effective manner that would be compatible with and supportive of elements of the Integrated Watershed Monitoring Program. Project components include secondary earthen levees and a diversion channel to redirect overland flood flows into the Yolo Bypass, modification of the Cache Creek Settling Basin to allow conveyance of flood flows into the Yolo Bypass, and various bridge and/or culvert improvements to facilitate conveyance of flood flows in the diversion channel.</p>	Could result in impacts on giant garter snake and other species that occur in the Cache Creek Settling Basin and Yolo Bypass.
Submersed Aquatic Vegetation (SAV) Control Program	California State Parks Division of Boating and Waterways (DBW)	Ongoing	<p>Previously known as the <i>Egeria densa</i> Control Program, the SAV Control Program is part of the California State Parks DBW Aquatic Invasive Plant Control Program (AIPCP). From 2001 through 2015, DBW operated the original <i>Egeria densa</i> Control Program (EDCP) in the Sacramento-San Joaquin Delta and its tributaries. With the addition of curlyleaf pondweed (<i>Potamogeton crispus</i> L.) in 2016, the</p>	Beneficial effects on freshwater marsh and aquatic habitats.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			<p>program was renamed as the SAV Control Program.</p> <p>The program includes treatment with herbicides and annual environmental monitoring, in pursuant to BiOps issued by USFWS and NMFS and State Water Resources Control Board Statewide General NPDES permit.</p>	
Floating Aquatic Vegetation (FAV) Control Program	California State Parks DBW	Ongoing	<p>The FAV Control Program is part of the California State Parks DBW AIPCP. It was created in 2015 when DBW combined the Water Hyacinth (and Spongeplant) Control Program with the Water Primrose (<i>Ludwigia hexapetala</i>) Control Program.</p> <p>The program includes treatment with herbicides, mechanical harvesting, biological control (in partnership with USDA), hand picking, and annual environmental monitoring, pursuant to the Aquatic Invasive Plant Control Program BiOps issued by USFWS and NMFS and the State Water Resources Control Board Statewide General NPDES permit.</p>	Beneficial effects on freshwater marsh and aquatic habitats.
Private Lands Incentive Programs	CDFW	Ongoing	<p>CDFW manages the California Waterfowl Habitat Program (Presley Program), a multi-faceted wetland incentive program designed to improve habitat for waterfowl on private lands. Consistent with its primary waterfowl habitat objectives, the program also endeavors to enhance habitat for shorebirds, wading birds, and other wetland- dependent species. The program pays private landowners \$30/acre (\$60/acre in the Tulare Basin) annually for a 10-year duration to implement habitat practices in accordance with a detailed management plan. In cooperation with Wildlife Conservation Board's Inland Wetland Conservation Program, CDFW also administers the Permanent Wetland Easement Program that pays willing landowners approximately 50-70% of their property's fair market value to purchase the farming and development rights in perpetuity. Landowner retains many rights including: trespass rights, the right to hunt and/or operate a hunting club, and the ability to pursue other types of</p>	Beneficial effects on waterfowl.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			undeveloped recreation (fishing, hiking, etc.). Easement landowners are required to follow a cooperatively developed wetland management plan. CDFW also administers the California Winter Rice Habitat Incentive Program to annual incentive payments of \$15/acre to landowners for winter flooding of harvested rice fields for a minimum of 70 continuous days.	
California Aquatic Invasive Species Management Plan	CDFW	Ongoing	The California Aquatic Invasive Species Management Plan (CAISMP) was released in January 2008. The plan's overall goal is to identify the steps that need to be taken to minimize the harmful ecological, economic, and human health impacts of aquatic invasive species in California. This plan provides the state's first comprehensive, coordinated effort to prevent new invasions, minimize impacts from established aquatic invasive species and establish priorities for action statewide. In addition, it proposes a process for annual plan evaluation and improvement so that aquatic invasive species can continue to be managed in the most efficient manner in the future. Eight major objectives and 163 actions were identified in the CAISMP.	Beneficial effects on terrestrial biologicals resources.
Aquatic Invasive Species Draft California Rapid Response Plan	CDFW	Ongoing	The California Aquatic Invasive Species Management (described above) proposes an Aquatic Invasive Species Rapid Response Plan for the State of California. The Rapid Response Plan establishes a draft general procedure for rapid response following detection of new aquatic invasive species infestation. It provides a framework for developing and implementing a rapid response plan. It is preliminary in that it describes types of information, resources and decisions necessary to finalize the plan. In order to finalize, fund, and implement the draft Rapid Response Plan, CDFW expects that cooperating agencies will assign staff to participate. CDFW Invasive Species Program staff will provide coordination for the interagency activities called for in the agreement(s).	Beneficial effects on freshwater marsh and aquatic habitats.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
Bethany Dams Improvement Project	DWR	In progress	<p>To ensure the long-term safety and operations of the State Water Project (SWP), DWR is conducting additional vegetation removal in the drainage ditches at Dams 1 and 2, removing accumulated sediment blocking the culvert in the drainage ditch at Dam 3, repairing existing rodent burrow damage on the dam faces, establishing a long-term, sustainable program of effective rodent control to reduce or eliminate further burrowing within the dam embankments, and performing annual maintenance to repair new rodent burrow damage at the four Bethany Reservoir Dams.</p> <p>Work for this project began in April of 2021 for completion in 2022.</p>	Potential impacts on California tiger salamander and other terrestrial biological resources.
Lower Sherman Island Wildlife Area (LSIWA) Land Management Plan (LMP)	CDFW	Ongoing	<p>The LSIWA occupies roughly 3,900 acres, primarily marsh and open water, at the confluence of the Sacramento and San Joaquin Rivers in the western Delta. This extensive tract of natural vegetation and Delta waters provides diverse and valuable wildlife habitats and related recreational opportunities and is integral to the functioning and human use of the Delta.</p> <p>The mission of the CDFW is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. The LMP is consistent with that mission.</p> <p>The purpose of the LMP is to: (1) guide management of habitats, species, and programs described in the LMP to achieve the CDFW's mission to protect and enhance wildlife values; (2) serve as a guide for appropriate public uses of the LSIWA; (3) serve as descriptive inventory of fish, wildlife, and native plant habitats that occur on or use the LSIWA; (4) provide an overview of the property's operation and maintenance and of the personnel requirements associated with implementing management goals (this LMP also serves as a budget planning aid for annual regional budget preparation); and (5) present the environmental documentation necessary for compliance with state and federal</p>	Beneficial effects on terrestrial biologicals resources.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
Yolo Bypass Wildlife Area Land Management Plan	CDFW	Ongoing	<p>statutes and regulations, provide a description of potential and actual environmental impacts that may occur during plan management, and identify mitigation measures to avoid or lessen these impacts.</p> <p>The Yolo Bypass Wildlife Area comprises approximately 16,770 acres of managed wildlife habitat and agricultural land within the Yolo Bypass. The bypass conveys seasonal high flows from the Sacramento River to help control river stage and protect the cities of Sacramento, West Sacramento, and Davis and other local communities, farms, and lands from flooding. Substantial environmental, social, and economic benefits are provided by the Yolo Bypass, benefiting the people of the State of California.</p> <p>The stated purposes of the Yolo Bypass Wildlife Area Land Management Plan are to: (1) guide the management of habitats, species, appropriate public use, and programs to achieve CDFW's mission; (2) direct an ecosystem approach to managing the Yolo Bypass Wildlife Area in coordination with the objectives of the CALFED ERP; (3) identify and guide appropriate, compatible public-use opportunities within the Yolo Bypass Wildlife Area; (4) direct the management of the Yolo Bypass Wildlife Area in a manner that promotes cooperative relationships with adjoining private-property owners; (5) establish a descriptive inventory of the sites and the wildlife and plant resources that occur in the Yolo Bypass Wildlife Area; (6) provide an overview of the Yolo Bypass Wildlife Area's operation, maintenance, and personnel requirements to implement management goals, and serve as a planning aid for preparation of the annual budget for the Bay-Delta Region (Region 3); and (7) present the environmental documentation necessary for compliance with state and federal statutes and regulations, provide a description of potential and actual environmental impacts that may occur during plan management, and</p>	Beneficial effects on terrestrial biologicals resources.



Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			identify mitigation measures to avoid or lessen these impacts.	
Staten Island Wildlife- Friendly Farming Demonstration	CDFW	Ongoing	Acquisition and restoration of Staten Island (9,269 acres) by The Nature Conservancy to protect critical agricultural wetlands used by waterfowl and sandhill cranes. Phase II of this project improved wildlife-friendly agriculture to foster recovery of at-risk species and to investigate effects of agriculture on water quality. This demonstration project for wildlife-friendly agriculture practices increased habitat availability by flooding 2,500-5,000 acres of corn for a longer duration than previously possible. The demonstration project also determined the effect of winter flooding strategies on target bird species, namely greater sandhill crane and northern pintail in the Delta Ecological Management Zone.	Beneficial for cranes.
Restoring Ecosystem Integrity in the Northwest Delta	CDFW	Ongoing	Completed in 2015, this project acquired conservation easements within the Cache Slough Complex, along the Barker, Lindsey and Calhoun Sloughs, north Delta tidal channels located west of the Yolo Bypass. Acquisition of conservation easements are on 978 acres of existing riparian, wetland and/or agricultural lands.	Beneficial effects on terrestrial biologicals resources.
Suisun Marsh Habitat Management, Preservation, and Restoration Plan	CDFW, USFWS, Reclamation, and Suisun Marsh Charter Group	Ongoing	The Suisun Marsh Charter Group, a collaboration of federal, state, and local agencies with primary responsibility in Suisun Marsh, prepared the Suisun Marsh Habitat Management, Preservation, and Restoration Plan. The plan balances implementation of the CALFED Program, the Suisun Marsh Preservation Agreement, and other management and restoration programs within the Suisun Marsh in a manner that is based upon voluntary participation by private landowners and that responds to the concerns of interested parties. Charter agencies include Reclamation, DWR, USFWS, Delta Stewardship Council, Suisun Resource Conservation District, and NMFS.  The Charter Group is charged with developing a regional plan that would outline the actions needed in Suisun	Beneficial for marsh species.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			<p>Marsh to preserve and enhance managed seasonal wetlands, restore tidal marsh habitat, implement a comprehensive levee protection/improvement program, and protect ecosystem and drinking water quality. The plan would be consistent with the goals and objectives of the Bay-Delta Program and would balance those goals and objectives with the Suisun Marsh Preservation Agreement and federal and state endangered species programs within the Suisun Marsh. The Suisun Marsh Habitat Management, Preservation, and Restoration Plan also provides for simultaneous protections and enhancement of: (1) existing wildlife values in managed wetlands, (2) endangered species, (3) tidal marshes and other ecosystems, and (4) water quality, including, but not limited to, the maintenance and improvement of levees.</p> <p>Restoration projects that are expected to partially fulfill requirements of the Suisun Marsh Habitat Management, Preservation, and Restoration Plan include the Chipps Tidal Habitat Restoration Project, Arnold Slough Restoration Project, Bradmoor Island Restoration Project, Tule Red Tidal Restoration Project, and Wings Landing Tidal Habitat Restoration Project.</p>	
Central Valley Vision	California State Parks	Ongoing	<p>In 2003, California State Parks began work on a long-term Central Valley Vision to develop a strategic plan for State Parks expansion in the Central Valley. The plan will provide a 20-year road map for State Park actions to focus on increasing service to Valley residents and visitors. Within the Great Central Valley (San Joaquin Valley, Sacramento Valley, and the Delta region), California State Parks operates and maintains 32 state park units representing 7% of the total state park system acreage. Plans include: Delta Meadows River Park, Brannan Island SRA, Franks Tract SRA, Locke Boarding House, and San Joaquin and Sacramento Rivers.</p>	Beneficial effects on terrestrial biological resources.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			In 2008, California State Parks published a Draft Central Valley Vision Implementation Plan that focuses on meeting the public's recreation needs in the Central Valley 20 years into the future. It outlines planning options to develop new and improved recreation opportunities, acquire new park lands, and build economic and volunteer partnerships.	
Central Valley Flood Protection Plan	DWR	Ongoing	<p>Central Valley Flood Protection Plan (CVFPP) is a sustainable, integrated flood management plan that reflects a system-wide approach for protecting areas of the Central Valley currently receiving protection from flooding by existing facilities of the State Plan of Flood Control (SPFC). The plan incorporates the SPFC and Flood Control System Status Update. The first plan was adopted in 2012 and is updated every 5 years.</p> <p>The CVFPP recommends actions to reduce the probability and consequences of flooding. Produced in partnership with federal, Tribal, local, and regional partners and other interested parties, the CVFPP also identifies the mutual goals, objectives, and constraints important in the planning process; distinguish plan elements that address mutual flood risks; and, finally, recommend improvements to the state-federal flood protection system.</p>	Could result in impacts on giant garter snake and other species that occur in the Yolo Bypass if plans include expanding the Bypass.
Delta Flood Emergency Preparedness, Response, and Recovery Program	DWR	Ongoing	<p>Pursuant to the Disaster Preparedness and Flood Prevention Bond Act of 2006, DWR developed the Delta Flood Emergency Preparedness, Response, and Recovery Program to prepare for, respond to, and recover from large-scale catastrophic flooding emergencies in the Delta region.</p> <p>The objectives of this program include: (1) protect the lives, property, and infrastructure critical to the functioning of both the Delta and California; (2) protect water quality and restore water supply for both Delta and export water users; (3) reduce the recovery time of California's water supply to less than 6 months; and (4) minimize impacts on environmental resources. Under this program, DWR</p>	Beneficial effects on terrestrial biological resources.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			finalized the Delta Flood Emergency Management Plan in 2018 to help manage risk of levee failures in the Delta and guide DWR Delta flood emergency management.	
Levee Repairs Program	DWR	Ongoing	<p>On February 24, 2006, Governor Arnold Schwarzenegger declared a State of Emergency for California's levee system, commissioning up to \$500 million of state funds to repair and evaluate state/federal project levees. Following the emergency declaration, the Governor directed DWR to secure the necessary means to fast-track repairs of critical erosion sites.</p> <p>Hundreds of levee sites were identified for immediate repair throughout the Central Valley. These repairs were necessary to maintain the functionality of flood control systems that have deteriorated over time and/or do not meet current design standards. While many of the most urgent repairs have been completed or are near completion, other sites of lower priority are still in progress, and still more are in the process of being identified, planned, and prioritized.</p> <p>In general, repairs to state/federal project levees are being conducted under three main programs: the Flood System Repair Project, the Sacramento River Bank Protection Project, and the Public Law 84-99 (PL 84-99) Rehabilitation Program.</p> <p>DWR has completed geotechnical exploration, testing, and analysis of state and federal levees that protect several highly populated urban areas of greater Sacramento, Stockton/Lathrop, and Marysville/Yuba City. This program is being implemented simultaneously with the various urgent levee repairs.</p>	Impacts on plants and wildlife that occur along Delta shorelines and on Delta islands.
Old Banks Landfill Cap Project	DWR	Completed	DWR is constructing the Old Banks Landfill Cap Project to cap the Old Banks Landfill (also known as the Harvey O. Banks Pumping Plant Landfill) to address concerns related to landfill debris exposure raised by the Contra Costa County Health Department (CCCHD). This proposed	Potential impacts on terrestrial species during construction.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			<p>project is located approximately 9 miles northwest of the City of Tracy and 12 miles northeast of the City of Livermore in Contra Costa County.</p> <p>Landfill debris concerns would be addressed by DWR by confining the landfill materials and preventing the landfill contents from being exposed by rodent activities, as well as improving surface drainage and minimizing future maintenance. Project activities include clearing existing vegetation, removing the upper 2 to 4 inches of topsoil of the landfill crown, grading the existing landfill crown by adding fill soil materials in localized areas to bring the site to grade, placing a commercially available rodent control barrier material, placing a 1-foot thick surface layer on top of the rodent control fill fabric to protect it, and returning the project site to near pre-project conditions by hydroseeding.</p> <p>A Notice of Completion for an IS/MND was filed on October 25, 2019. This project was completed December 10, 2021.</p>	
Lower Yolo Ranch Restoration Project	State and Federal Contractors Water Agency, DWR, and MOA Partners	Ongoing	<p>The project is located in the lower Yolo Bypass and is a tidal and seasonal salmon habitat project restoring tidal flux to about 1,670 acres of existing pastureland. The project site includes the Yolo Ranch, also known as McCormack Ranch, which was purchased in 2007 by the Westlands Water District. The goal of this project is to provide important new sources of food and shelter for a variety of native fish species at the appropriate scale in strategic locations in addition to ensuring continued or enhanced flood protection. The lower Yolo wetlands restoration project is part of an adaptive management approach in the Delta to learn the relative benefits of different fish habitats, quantify the production and transport of food and understand how fish species take advantage of new habitat.</p>	Beneficial effects on terrestrial biological that use marshes and impacts on grassland species.
Meins Landing Restoration	DWR, Suisun Marsh Preservation Agreement agencies, and	In progress	<p>Meins Landing is a 668-acre property in the eastern Suisun Marsh along Montezuma Slough that was purchased in 2005 as part of a multi-agency tidal restoration project. Previously a duck</p>	Benefits to tidal species.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
	State Coastal Conservancy		<p>club, the property was purchased to restore it to tidal influence by breaching the levee. Due to the presence of three underground gas and oil pipelines with restrictive easements, the original restoration concept for the site was not able to be implemented. While DWR explored other restoration options, the property was leased to the previous owners for 10 years and was operated as a duck club until the lease ended in 2016.</p> <p>The property is currently being operated as a managed marsh and maintained by DWR and Suisun Resource Conservation District, with no hunting leases on the property and restricted public access. As a managed marsh, the current operation goals are:</p> <p>(1) Operate Meins as a managed marsh to provide productive habitat for a diverse population of waterfowl, salt marsh harvest mouse, and other wildlife.</p> <p>(2) Formulate and test management practices to maximize nutrient production and export into adjacent sloughs to meet objectives of the Delta Smelt Resiliency Strategy.</p> <p>(3) Provide research opportunities for study of primary and secondary production, waterfowl feed utilization, nutrient export, and other topics to meet objectives of the Delta Smelt Recovery Plan.</p> <p>(4) Explore providing public access and hunting opportunities to meet demands by the SF Bay Conservation and Development Commission (BCDC) for habitat restoration projects in Suisun Marsh to include public access. Managed wetlands, like Meins Landing, are potentially more effective (and cheaper) at augmenting local food production than creating intertidal wetlands while providing more diverse habitats for multiple species. Research on managed wetlands is critical to understand the management techniques best suited to boost food/nutrient production while minimizing impacts to other species (e.g., waterfowl, western pond turtle, salt marsh harvest mouse). Once best</p>	

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			management practices are identified, they could be evaluated on other sites throughout Suisun Marsh with cooperating landowners. Research by UC Davis and California Trout is currently underway on Meins Landing to evaluate primary and secondary production and determine optimal conditions to increase the production.	
Mayberry Farms Subsidence Reversal and Carbon Sequestration Project	DWR	Completed in 2010	<p>The Mayberry Farms Subsidence Reversal and Carbon Sequestration Project created permanently flooded wetlands on a 307-acre parcel on Sherman Island that is owned by DWR. The project has restored approximately 192 acres of emergent wetlands and enhanced approximately 115 acres of seasonally flooded wetlands. Construction occurred in summer 2010. Ongoing operations and maintenance is routinely performed by DWR.</p> <p>The Mayberry Farms project was conceived as a demonstration project that would provide subsidence reversal benefits and develop knowledge that could be used by operators of private wetlands (including duck clubs) that manage lands for waterfowl-based recreation. By maintaining permanent water, the growth and subsequent decomposition of emergent vegetation is expected to control and reverse subsidence. The project is also anticipated to provide climate benefits by sequestering atmospheric CO<sub>2</sub>. The project is expected to provide year-round wetland habitat for waterfowl and other wildlife.</p>	Beneficial effects on marsh species.
Sherman Island Setback Levee-Mayberry Slough	DWR	Completed	Reclamation District 341, with funding from DWR, constructed four sections of setback levee to increase levee stability along Mayberry Slough on Sherman Island in 2004 and 2005. The Sherman Island setback levee represents an opportunity to reverse some of the ecological damage resulting from levee construction and maintenance by implementing a habitat development project that will augment the existing riparian vegetation and provide habitat for native species. Project implementation restored tidal wetland and riparian habitat.	Beneficial effects on terrestrial biological resources.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			Construction of the waterside portion of the setback levee was divided into two phases (Phase IIA, Phase IIB) that were completed in fall 2008 and fall 2009, respectively. Vegetation monitoring and maintenance was conducted until 2013.	
Sherman Island Whale's Mouth Wetlands	DWR	Completed	The Sherman Island Whale's Mouth Wetland Restoration Project restored approximately 600 acres of palustrine emergent wetlands within an 877-acre project boundary on a nearly 975-acre parcel on Sherman Island that is owned by the California Department of Water Resources (DWR). The property is currently managed for flood irrigated pasture land, which includes a regular and extensive disturbance regime associated with field prepping, disking, and grazing. The ultimate outcome of the restoration project was hundreds of additional acres of freshwater emergent wetlands. Other native plant restoration components included installation of native trees and shrubs compatible with their respective hydrologic regime as well as a substantial amount of upland transitional area, all of which provide a diversity of habitat structure and function. The project was completed in 2015.	Beneficial effects on terrestrial biological resources.
Sherman Island— Whale's Belly Wetlands	DWR	In progress	Whale's Belly is part of the California EcoRestore Initiative to restore and protect at least 30,000 acres of habitat across the Sacramento–San Joaquin Delta. The project objectives are to reduce the effects of climate change and Delta subsidence, as well as improve habitat for millions of migrating birds along the Pacific Flyway that rely on the Delta as a crucial rest stop and safe haven. Whale's Belly is one of four projects on Sherman Island that creates managed wetlands, tidal wetlands, and setback levees to contribute toward EcoRestore's restoration targets. The Whale's Belly Wetland Restoration Project includes adding soils and materials to support protective levees and riverbanks, enabling these structures to effectively hold back high floodwaters. Construction will also	Beneficial effects on terrestrial biological resources.



Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			involve relocation of drainage ditches, pipelines, and water pumps. Upon completion of construction activities, the island will be inundated to an approximate depth of 1–3 feet, allowing marshland growth to eliminate subsidence on this southeast section of Sherman Island.  The project began in May 2020 and is scheduled for completion by Summer 2022.	
Twitchell Island—East End Wetland Restoration	DWR	Completed	The Twitchell Island East End Wetland Restoration Project restored approximately 740 acres of palustrine emergent wetlands and approximately 50 acres of upland and riparian forest habitat on Twitchell Island. This property is owned by the DWR and previously managed as flood irrigated corn and alfalfa. This project was completed in 2013.	Beneficial effects on terrestrial biological resources.
Twitchell Island—San Joaquin River Setback Levee	DWR	Planning phase	This project will stabilize a threatened section of levee along the San Joaquin River and allow for several different types of waterside habitat features to be constructed. Expected habitat types include riparian shaded riverine aquatic, intertidal habitats, and upland vegetation created by waterside beaches, benches, and undulations. An original 2,200-foot section was completed in 2000, and is currently serving as a model for an approximately 23,000-foot setback spanning the entire San Joaquin River levee plus a proposed 80-acre tidal marsh restoration site on Chevron Point. There are eight reaches to the setback project. Reach #6, a 2,680-foot setback levee reach is the top priority. Funding has not yet been secured but all permits have been obtained. Reach #10 is the Chevron Point Dryland Levee that separates the 80-acre tidal marsh restoration site from the rest of the island.	Beneficial effects on terrestrial biological resources.
North Delta Flood Control and Ecosystem Restoration Project	DWR	Ongoing	Consistent with objectives contained in the CALFED Record of Decision, the North Delta Flood Control and Ecosystem Restoration Project is intended to improve flood management and provide ecosystem benefits in the north Delta area	Beneficial effects on terrestrial biological resources.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			<p>through actions such as construction of setback levees and configuration of flood bypass areas to create quality habitat for species of concern. These actions are focused on McCormack-Williamson Tract and Staten Island. The purpose of the Project is to implement flood control improvements in a manner that benefits aquatic and terrestrial habitats, species, and ecological processes. Flood control improvements are needed to reduce damage to land uses, infrastructure, and the Bay-Delta ecosystem resulting from overflows caused by insufficient channel capacities and catastrophic levee failures near where the Mokelumne River, Cosumnes River, Dry Creek, and Morrison Creek converge.</p>	
South Delta Temporary Barriers Project	DWR	In progress	<p>The 2017–2022 South Delta Temporary Barriers Project, consists of annual construction, operation, and removal of the Middle River, Old River near Tracy, Grant Line Canal, and Heald of Old River spring and fall rock barriers. The project reduces adverse water level impacts (i.e., minimum tide elevations) caused by the SWP and CVP export pumping on local agricultural diverters within the South Delta Water Agency.</p> <p>The South Delta Temporary Barriers Project consists of four rock barriers across south Delta channels. The objectives of the project are to increase water levels, improve water circulation patterns and water quality in the southern Delta for local agricultural diversions, and improve operational flexibility of the SWP to help reduce fishery impacts and improve fishery conditions. Of the four rock barriers, the barrier at the head of Old River serves as a fish barrier (intended to primarily benefit migrating San Joaquin River Chinook salmon) and is installed and operated in April–May and again in September–November. The remaining three barriers (Old River at Tracy, Grant Line Canal, Middle River) serve as agricultural barriers (intended to primarily benefit agricultural water users in the south</p>	Potential impacts on giant garter snake and Swainson’s hawk, and other aquatic and terrestrial species.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			Delta) and are installed and operated between April 15 and November 30 of each season.	
Dutch Slough Tidal Marsh Restoration Project	DWR and California State Coastal Conservancy	In progress	<p>The Dutch Slough Tidal Marsh Restoration Project, located near Oakley in Eastern Contra Costa County, would restore wetland and uplands, and provide public access to the 1,187-acre Dutch Slough property owned by the DWR. The property is composed of three parcels separated by narrow manmade sloughs. The project would provide ecosystem benefits, including habitat for sensitive aquatic species. It also would be designed and implemented to maximize opportunities to assess the development of those habitats and measure ecosystem responses so that future Delta restoration projects will be more successful.</p> <p>Two neighboring projects proposed by other agencies that are related to the Dutch Slough Restoration Project collectively contribute to meeting project objectives. These include the City of Oakley's proposed Community Park and Public Access Conceptual Master Plan for 55 acres adjacent to the wetland restoration project and 4 miles of levee trails on the perimeter of the DWR lands. The City Community Park will provide parking and trailheads for the public access components of the Dutch Slough Restoration Project.</p> <p>Construction on two of the parcels, Emerson and Gilbert, started in May 2018 and site grading completed in 2019, followed by revegetation planting. Breaching of these two parcels will be completed in 2021. Restoration planning of the third parcel, Burroughs, would begin in 2022.</p>	Beneficial effects on terrestrial biological resources
Los Vaqueros Reservoir Expansion	Reclamation, DWR, and CCWD	Planning phase	The Los Vaqueros Reservoir Expansion Project consists of enlarging the existing Los Vaqueros Reservoir and constructing related reservoir system facilities to develop water supplies for environmental water management that supports fish protection, habitat management, and other environmental needs in the Delta and tributary river systems, and to improve water supply	Potential impacts on California red-legged frog, California tiger salamander, golden eagle, and other terrestrial biological resources.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			<p>reliability and water quality for urban users in the San Francisco Bay Area.</p> <p>Los Vaqueros Reservoir is a 100,000 acre-foot off-stream storage reservoir owned and operated by Contra Costa Water District (CCWD) that is used to store water pumped from the Delta. This storage capacity allows CCWD to improve the water quality delivered to its customers and to adjust the timing of its Delta water diversions to accommodate the life cycles of Delta aquatic species, thus reducing species impact and providing a net benefit to the Delta environment.</p> <p>The proposed expansion project would increase the reservoir capacity to 275,000 acre-feet and add a new 470 cfs connection that would allow the Los Vaqueros system to provide water to South Bay water agencies – Alameda County Flood Control and Water Conservation District, Zone 7, Alameda County Water District, and Santa Clara Valley Water District – that otherwise would receive all of their Delta supplies through the existing SWP and CVP export pumps. It also would include construction of a new diversion on Old River with a capacity of 170 cfs. The new and expanded facilities would be operated in coordination with Reclamation and DWR to shift Delta pumping for the three South Bay water agencies from the CVP and SWP Delta export pumps to the expanded Los Vaqueros Reservoir system.</p> <p>In August 2020, Reclamation released its Final Feasibility Report, which documents potential costs and benefits of the expansion of Los Vaqueros Reservoir. The Recommended Plan described in the Report provides for Federal Cost sharing of up to 25% of project construction costs. A similar 25% federal share for Phase 2 construction was requested by members of Congress in a letter dated April 2, 2021, to the Department of the Interior. On January 20, 2021, the California Water Commission increased its Water Storage Investment Program funding for the project based on inflation.</p>	

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
Transfer- Bethany Pipeline with the Los Vaqueros Reservoir Expansion	U.S. Bureau of Reclamation, DWR, and Contra Costa Water District	Planning phase	The Los Vaqueros Reservoir Expansion Project includes expansion of the Los Vaqueros Reservoir from its current capacity of 160 TAF to 275 TAF, construction of a pipeline between CCWD's Transfer Pump Station and the SWP's California Aqueduct at Bethany Reservoir (the "Transfer-Bethany Pipeline"), upgrades to the existing Transfer Pump Station Facilities, and construction of the Neroly High Lift Station. Expansion of Los Vaqueros Reservoir improves Bay Area water supply reliability and water quality while protecting Delta fisheries and providing additional Delta ecosystem benefits. The proposed project will include a regional intertie (the Transfer-Bethany Pipeline) and improved pump stations and pipelines. The Transfer-Bethany Pipeline is composed of a new 300-cfs (84-inch-diameter) pipeline would deliver water from the Transfer Facility to the vicinity of Bethany Reservoir for South-of-Delta partners. The new Transfer-Bethany Pipeline would tie into the California Aqueduct just north of Bethany Reservoir in the Bethany Recreation Area.	Potential impacts on California red-legged frog, California tiger salamander, golden eagle, and other terrestrial biological resources.
The Riparian Bird Conservation Plan	California Partners in Flight and Riparian Habitat Joint Venture	Ongoing	The Riparian Habitat Joint Venture (RHJV) was initiated by California Partners in Flight in 1994. To date, 18 federal, state, and private organizations have signed the Cooperative Agreement to protect and enhance habitats for native landbirds throughout California. These organizations include the CDFW, DWR, California State Lands Commission, Ducks Unlimited, National Audubon Society, National Fish and Wildlife Foundation, The Nature Conservancy, The Trust for Public Land, The Resources Agency State of California, Reclamation, USFWS, U.S. Geological Survey, and Wildlife Conservation Board. The RHJV, modeled after the successful Joint Venture projects of the North American Waterfowl Management Plan, reinforces other collaborative efforts currently underway that protect biodiversity and	Beneficial effects on riparian species.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			<p>enhance natural resources as well as the human element they support.</p> <p>The vision of the RHJV is to restore, enhance, and protect a network of functioning riparian habitat across California to support the long-term viability of landbirds and other species. A wide variety of other species of plants and animals will benefit through the protection of forests along rivers, streams, and lakes. The RHJV mission is to provide leadership and guidance to promote the effective conservation and restoration of riparian habitats in California through the following goals: (1) Identify and develop technical information based on sound science for a strategic approach to conserving and restoring riparian areas in California; (2) Promote and support riparian conservation on the ground by providing guidance, technical assistance and a forum for collaboration; and (3) Develop and influence riparian policies through outreach and education.</p> <p>In 2004, Partners in Flight and the RHJV prepared The Riparian Bird Conservation Plan, a guidance document that outline a strategy for conserving riparian birds, including birds using the Delta.</p>	
Central Valley Joint Venture Program	Central Valley Joint Venture	Ongoing	<p>The Central Valley Joint Venture (CVJV) is a self-directed coalition consisting of 22 state and federal agencies and private conservation organizations. The partnership directs their efforts toward the common goal of providing for the habitat needs of migrating and resident birds in the Central Valley of California. The CVJV was established in 1988 as a regional partnership focused on the conservation of waterfowl and wetlands under the North American Waterfowl Management Plan. It has since broadened its focus to the conservation of habitats for other birds, consistent with major national and international bird conservation plans and the North American Bird Conservation Initiative.</p> <p>The CVJV provides guidance and facilitates grant funding to accomplish its habitat goals and objectives.</p>	Beneficial effects on waterfowl and wetland species.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			Integrated bird conservation objectives for wetland habitats in the Central Valley identified in the 2006 Implementation Plan include restoration of 19,170 acres of seasonal wetland, enhancement of 2,118 acres of seasonal wetland annually, restoration of 1,208 acres of semi-permanent wetland, and restoration of 1,500 acres of riparian habitat.	
Cache Creek, Bear Creek, Sulfur Creek, Harley Gulch Mercury TMDL	Central Valley Regional Water Quality Control Board	Ongoing	Historic mining activities in the Cache Creek watershed have discharged and continue to discharge large volumes of inorganic mercury to creeks in the watershed. Much of the mercury discharged from the mines is now distributed in the creek channels and floodplain downstream from the mines. Natural erosion processes are expected to slowly move the mercury downstream out of the watershed over the next several hundred years. However, current and proposed activities in and around the creek channel can enhance mobilization of this mercury. To reduce mercury loads in these streams, which ultimately connect to the northern Delta, the Central Valley Regional Water Quality Control Board is implementing mercury TMDLs for Cache Creek and its tributaries, as well as Sulfur Creek. The implementation plans require a reduction in mercury loads through a combination of actions to clean up mines, sediments, and wetlands; identify engineering options; control erosion reduction actions and perform studies and monitoring.	Potential beneficial effects on Delta species that are part of the aquatic food chain.
Sacramento–San Joaquin Delta Estuary TMDL for Methylmercury	Central Valley Regional Water Quality Control Board	Ongoing	The Central Valley Regional Water Quality Control Board identified the Delta as impaired because of elevated levels of methylmercury in Delta fish that pose a risk for human and wildlife consumers. As a result, it initiated the development of a water quality attainment strategy to resolve the mercury impairment. The strategy has two components: the methylmercury total maximum daily load (TMDL) for the Delta and the amendment of the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (the Basin Plan) to	Potential beneficial effects on Delta species that are part of the aquatic food chain.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			<p>implement the TMDL program. The Basin Plan amendment requires methylmercury load and waste load allocations for dischargers in the Delta and Yolo Bypass to be met as soon as possible, but no later than 2030. The regulatory mechanism to implement the Delta Mercury Control Program for point sources would be through NPDES permits. Nonpoint sources would be regulated in conformance with the State Water Resources Control Board's Nonpoint Source Implementation and Enforcement Policy. Both point and nonpoint source dischargers would be required to conduct mercury and methylmercury control studies to develop and evaluate management practices to control mercury and methylmercury discharges. The Regional Water Board will use the study results and other information to amend relevant portions of the Delta Mercury Control Program during the Delta Mercury Control Program Review.</p> <p>The Basin Plan amendment also requires proponents of new wetland and wetland restoration projects scheduled for construction after 2011 to either participate in a comprehensive study plan or implement a site-specific study plan, evaluate practices to minimize methylmercury discharges, and implement newly developed management practices as feasible. Projects would be required to include monitoring to demonstrate effectiveness of management practices.</p> <p>Activities, including changes to water management and storage in and upstream of the Delta, changes to salinity objectives, dredging and dredge materials disposal and reuse, and changes to flood conveyance flows, would be subject to the open water methylmercury allocations. Agencies would be required to include requirements for projects under their authority to conduct control studies and implement methylmercury reductions as necessary to comply with the allocations by 2030.</p>	



Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan	Contra Costa County and East Contra Costa County Habitat Conservancy	Ongoing	<p>The East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (Plan) was adopted in 2006 and provides regional conservation and development guidelines to protect natural resources while improving and streamlining the permit process for endangered species and wetland regulations. The Plan was developed by a team of scientists and planners with input from independent panels of science reviewers and interested parties. Within the 174,018-acre inventory area, the Plan provides permits for between 8,670 and 11,853 acres of development and will permit impacts on an additional 1,126 acres from rural infrastructure projects. The Plan will result in the acquisition of a preserve system that will encompass 23,800 to 30,300 acres of land that will be managed for the benefit of 28 species as well as the natural communities that they depend upon.</p> <p>The East Contra Costa County Habitat Conservancy is a joint exercise of powers authority formed by Contra Costa County and the cities of Brentwood, Clayton, Oakley, and Pittsburg to implement the Plan. It allows Contra Costa County, the Contra Costa County Flood Control and Water Conservation District, the East Bay Regional Park District and the cities of Brentwood, Clayton, Oakley, and Pittsburg (collectively, the Permittees) to control permitting for activities and projects they perform or approve in the region that have the potential to adversely affect state- and federally listed species. The Plan also provides for comprehensive species, wetlands, and ecosystem conservation and contributes to the recovery of endangered species in northern California. The Plan avoids project-by-project permitting that often results in uncoordinated and biologically ineffective mitigation.</p>	Beneficial effects on terrestrial biological resources through coordinated planning efforts, despite impacts on species from approved development.
Delta Protection Commission Land Use and Resource	Delta Protection Commission	Ongoing	The Delta Protection Commission (DPC), created with passage of the Delta Protection Act, was formed to adaptively protect, maintain, and where possible, enhance and restore	Beneficial effects on terrestrial biological resources.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
Management Plan Update			<p>the overall quality of the Delta environment consistent with the Delta Protection Act and the Land Use and Resource Management Plan (LURMP) for the Primary Zone.</p> <p>The DPC is currently updating its LURMP, which was last adopted in 2010. The LURMP outlines the long-term land use requirements for the Delta and sets out findings, policies, and recommendations in the areas of environment, utilities and infrastructure, land use, agriculture, water, recreation and access, levees, and marine patrol/boater education/safety programs.</p> <p>The updated LURMP will place increased emphasis on the requirement for local government general plans to provide for consistency with the provisions of the LURMP. The DPC develops priorities and timelines for tasks to be implemented each year and provides annual progress reports to the Legislature. One of the tasks identified by the DPC is to monitor the Delta Vision, Bay Delta Conservation Plan, and Delta Risk Management Strategy processes and provide input as deemed appropriate.</p>	
Delta Plan	Delta Stewardship Council	Ongoing	<p>The Delta Reform Act, created by Senate Bill X7-1, established the co-equal goals for the Delta of “providing a more reliable water supply for California and protecting, restoring, and enhancing the delta ecosystem.” (Public Resources Code § 29702; Water Code § 85054). These coequal goals are to be achieved “in a manner that protects and enhances the unique cultural, recreational, natural resources, and agricultural values of the Delta as an evolving place.” (Wat. Code § 85054).</p> <p>The Delta Reform Act also established the DSC. The DSC is tasked with furthering the State’s coequal goals for the Delta through development of the Delta Plan, a comprehensive, long-term, resource management plan for the Delta, containing both regulatory policies and recommendations aimed at furthering the coequal goals and</p>	Beneficial effects on terrestrial biological resources.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
Delta Adapts	Delta Stewardship Council (DSC)	Ongoing	<p>promoting a healthy Delta ecosystem. The Delta Plan provides for a distinct regulatory process for activities that qualify as Covered Actions under Water Code Section 85057.5. State and local agencies proposing Covered Actions, prior to initiating implementation of that action, must prepare a written certification of consistency with detailed findings regarding consistency with applicable Delta Plan policies and submit that certification to the DSC.</p> <p>The DSC decided to take action in the Delta and Suisun Marsh in response to climate change at its May 2018 meeting, directing staff to begin a two-phase effort preparing:  <i>(1) a vulnerability assessment</i> to improve understanding of regional vulnerabilities in order to protect the vital resources the Delta provides to California and beyond with state interests and investments top of mind; and <i>(2) an adaptation plan</i> detailing strategies and tools that state, regional, and local governments can use to help communities, infrastructure, and ecosystems thrive in the face of climate change.</p> <p>Together, these two phases form the <i>Delta Adapts: Creating a Climate Resilient Future</i> initiative, a comprehensive, regional approach to climate resiliency that cuts across regional boundaries and commits to collaboration across state, local, and regional levels.</p> <p>Delta Adapts supports the Delta Reform Act, <a href="#">Executive Order B-30-15</a>, and the Delta Plan.</p> <p>The goals of Delta Adapts are to: (1) inform future work at the Council; Provide local governments with a toolkit of information to incorporate into their regulatory and planning documents; (2) integrate climate change into the state's prioritization of future Delta actions and investments; and (3) serve as a framework to be built upon by the Council and others in years to come. DSC staff are pursuing these goals across the two phases, while following the statutory</p>	Beneficial effects on terrestrial biological resources.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			requirements outlined in the Delta Reform Act of 2009. Delta Adapts will consider climate change impacts that are expected to occur and amend the Delta Plan, where applicable.	
Liberty Island Conservation Bank	Reclamation District 2093	Ongoing	<p>This project received permits and approvals in 2009 to create a conservation bank on the northern tip of Liberty Island that would preserve, create, restore, and enhance habitat for native Delta fish species, including Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, California Central Valley steelhead, delta smelt, and Central Valley fall- and late fall-run Chinook salmon. The project consists of creating tidal channels, perennial marsh, riparian habitat, and occasionally flooded uplands on the site. The project also includes the breaching of the northernmost east-west levee, and preservation and restoration of shaded riverine aquatic habitat along the levee shorelines of the tidal sloughs.</p> <p>The island's private levees failed in the 1997 flood and were not recovered, leaving all but the upper 1,000 acres and the adjacent levees permanently flooded. These upper acres encompass the proposed bank. The lower nearly 4,000 acres will remain, at least for the near future, predominantly open water and subtidal because tidal elevations are too great for marsh or riparian habitat.</p>	Beneficial effects on terrestrial biological species using riparian and wetland habitat, some impacts on species using croplands for foraging.
Flood Management Program	Sacramento Area Flood Control Agency, Central Valley Flood Protection Board, and USACE	Ongoing	<p>The Sacramento Area Flood Control Agency (SAFCA) Flood Management Program includes studies, designs, and construction of flood control improvements. In the South Sacramento area, SAFCA projects include the South Sacramento Streams Project and the Sacramento River Bank Protection Project. The South Sacramento Streams Project consists of levee, floodwall, and channel improvements starting south of the town of Freeport along the Sacramento River to protect the City of Sacramento from flooding associated with Morrison, Florin, Elder, and Union House creeks. The Sacramento River</p>	Potential impacts on species using agricultural areas for foraging, on riparian species, and giant garter snake.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			Bank Protection Project, which is implemented and funded primarily through USACE, addresses long-term erosion protection along the Sacramento River and its tributaries. Bank protection measures typically consist of large angular rock placed to protect the bank, with a layer of soil/rock material to allow bank revegetation. SAFCA contributes to funding the local share for bank protection activities within its jurisdiction.	
South Sacramento Habitat Conservation Plan	South Sacramento Conservation Agency Joint Powers Authority	Ongoing	<p>The South Sacramento Habitat Conservation Plan (HCP) is a regional plan to address issues related to species conservation, agricultural protection, and urban development in south Sacramento County. Adopted in 2018, the HCP covers 40 different species of plants and wildlife including 10 that are state- or federally listed as threatened or endangered, and allow land owners to engage in the “incidental take” of listed species (i.e., to destroy or degrade habitat) in return for conservation commitments from local jurisdictions. The conservation measures outlined in the HCP would minimize and mitigate the impact of incidental take and provide for the conservation of covered species that may occur in the plan area.</p> <p>The geographic location of the HCP includes a combined 317,656 acres within south Sacramento County (unincorporated area) and the cities of Rancho Cordova, Elk Grove, and Galt.</p>	Beneficial effects on terrestrial biological resources through coordinated planning effort for conservation and development.
Harvest Water (formerly called the South County Ag Program)	Sacramento Regional County Sanitation District	Planning phase	Harvest Water is being developed by Sacramento Regional County Sanitation District (Regional San) and could deliver up to 50,000 acre-feet per year (AFY) of safe and reliable supply of tertiary-treated water for agricultural uses to more than 16,000 acres of permanent agriculture through irrigation, as well as habitat conservation lands near the Cosumnes River and Stone Lakes Wildlife Refuge. This project has received up to \$287.5 million through the Proposition 1 grant funding of the California Water Commission, Water Storage Investment Program. Regional San is currently	Beneficial effects on terrestrial biological resources.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
San Francisco Bay Mercury TMDL	San Francisco Bay Region Water Quality Control Board	Ongoing	working with local farmers and the initial planning stages of preliminary designs for transmission and distribution systems near Elk Grove in southern Sacramento County.	Potential beneficial effects on Delta species that are part of the aquatic food chain.
			San Francisco Bay is impaired because mercury contamination is adversely affecting existing beneficial uses, including sport fishing, preservation of rare and endangered species, and wildlife habitat. On February 12, 2008, EPA approved a Basin Plan amendment incorporating a TMDL for mercury in San Francisco Bay and an implementation plan to achieve the TMDL. The amendment was formerly adopted by the San Francisco Bay Water Board, the State Water Resources Control Board, and the state Office of Administrative Law. It is now officially incorporated into the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan). The San Francisco Bay mercury TMDL, which includes the waters of the Delta within the San Francisco Bay region, is intended to: (1) reduce mercury loads to achieve load and waste load allocations, (2) reduce methylmercury production and consequent risk to humans and wildlife exposed to methylmercury, (3) conduct monitoring and focused studies to track progress and improve the scientific understanding of the system, and (4) encourage actions that address multiple pollutants. The implementation plan establishes requirements for dischargers to reduce or control mercury loads and identifies actions necessary to better understand and control methylmercury production. In addition, it addresses potential mercury sources and describes actions necessary to manage risks to Bay fish consumers. Load reductions are expected via implementation of the Delta Methylmercury TMDL (river source), plus urban runoff management, Guadalupe River mine remediation, municipal and industrial wastewater source controls and pretreatment, and sediment remediation.	

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
San Joaquin County Multi- Species Habitat Conservation and Open Space Plan	San Joaquin Council of Governments	Ongoing	<p>Permitted in 2000, the key purpose of the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (Plan) is to provide a strategy for balancing the need to conserve open space and the need to convert open space to non-open space uses. These goals are intended to be met while protecting the region's agricultural economy; preserving landowner property rights; providing for the long-term management of plant, fish and wildlife species, especially those that are currently listed, or may be listed in the future, under the federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA); providing and maintaining multiple-use open spaces that contribute to the quality of life of the residents of San Joaquin County; and accommodating a growing population while minimizing costs to project proponents and society at large.</p> <p>The conservation strategy relies on minimizing, avoiding, and mitigating impacts on the species covered by the Plan. Minimization of impacts on covered species takes a species-based approach emphasizing the implementation of measures to minimize incidental take by averting the actual killing or injury of individual covered species and minimizing impacts on habitat for such species on open space lands converted to non-open space uses. Unavoidable impacts on covered species are addressed through a habitat-based approach that emphasizes compensation for habitat losses through the establishment, enhancement and management-in-perpetuity of preserves composed of a specific vegetation types or association of vegetation types (habitats) upon which discrete groups of covered species rely. The purchase of easements from landowners willing to sell urban development rights is the primary method for acquiring preserves. The Plan identifies zones distinguished by a discrete association of soil types, water regimes (e.g., Delta lands subject to tidal influence, irrigated lands, lands receiving only</p>	Beneficial effects on terrestrial biological resources.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			natural rainfall), elevation, topography, and vegetation types. In general, impacts within a particular zone are mitigated within the same zone	
San Joaquin County General Plan Update	San Joaquin County	Ongoing	The General Plan 2035 was adopted by the in December 2016. The general plan contains designations for residential, commercial, and industrial development through 2035. Most of the urban growth is directed to existing urban communities.	Potential impacts on terrestrial biological resources due to continued growth in the county.
Solano Multispecies Habitat Conservation Plan	Solano County Water Agency	In development	The Solano HCP is intended to support the issuance of an incidental take permit under the federal ESA for a period of 30 years. This permit is required by the March 19, 1999, Solano Project Contract Renewal BiOp between the USFWS and Reclamation. The scope of the Solano HCP was expanded beyond the requirements of the BiOp to include additional voluntary applicants and additional species for incidental take coverage. Thirty-seven species are proposed to be covered under the Solano HCP. The minimum geographical area to be covered is the Solano County Water Agency's contract service area that is the cities of Fairfield, Vacaville, Vallejo, Suisun City, the Solano Irrigation District, and the Maine Prairie Water District. The area covered by the HCP is all of Solano County and a small portion of Yolo County. The Final Administrative Draft was submitted to the lead agencies in June 2009. The HCP includes a Coastal Marsh Natural Community Conservation Strategy designed to maintain the water and sediment quality standards, hydrology of this natural community; contribute to the restoration of tidally influenced coastal marsh habitat; and promote habitat connectivity. Primary conservation actions include preservation (primarily through avoidance), restoration, invasive species control, and improvement of water quality.  The plan area Covers 580,000 acres, which includes 12,000 acres of proposed development and 30,000 acres that will be preserved.	Potential future beneficial effects on terrestrial biological resources.



Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
Delta Dredged Sediment Long-Term Management Strategy (LTMS)/Pinole Shoal Management Study	USACE	Ongoing	The Delta Dredged Sediment Long-Term Management Strategy is a cooperative planning effort to coordinate, plan, and implement beneficial reuse of sediments in the Delta. Five agencies (USACE, EPA, DWR, California Bay Delta Authority, and the Central Valley Regional Water Quality Control Board) have begun to examine Delta dredging, reuse, and disposal needs. The strategy development process will examine and coordinate dredging needs and sediment management in the Delta to assist in maintaining and improving channel function (navigation, water conveyance, flood control, and recreation), levee rehabilitation, and ecosystem restoration. Agencies and interested parties will work cooperatively to develop a sediment management plan that is based on sound science and protective of the ecosystem, water supply, and water quality functions of the Delta. As part of this effort, the sediment management plan will consider regulatory process improvements for dredging and dredged material management so that project evaluation is coordinated, efficient, timely, and protective of Delta resources.	Potential impacts on terrestrial species due to dredge stockpiling and on giant garter snake and western pond turtle from dredging activities and potential benefits from the plan's coordinated reuse of dredge material.
Lower San Joaquin Feasibility Study	USACE	Planning phase	The Lower San Joaquin Feasibility Study is intended to determine if there is a federal interest in providing flood risk management and ecosystem restoration improvements along the lower (northern) San Joaquin River. The lower San Joaquin River study area includes the San Joaquin River from the Mariposa Bypass downstream to, and including, the city of Stockton. The study area also includes the channels of the San Joaquin River in the southernmost reaches of the Delta: Paradise Cut and Old River as far north as Tracy Boulevard and Middle River as far north as Victoria Canal. The floodplains of the lower San Joaquin River and its tributaries are also included in the study area. Additionally, studies have been funded by grants from the California Delta Conservancy and funds from	Potential impacts and benefits on terrestrial biological resources, would vary by location and species.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			Reclamation District Number 2062. Currently the effort is being led by the San Joaquin County Resource Conservation District, American Rivers, and the South Delta Water Agency with the purpose of developing a mitigation strategy to consider and minimize the downstream effects of the future Paradise Cut Flood Bypass Expansion Project.	
Sacramento River Bank Protection Project	USACE	Planning phase	Originally authorized by Section 203 of the Flood Control Act of 1960, the Sacramento River Bank Protection Project is a long-term flood risk management project designed to enhance public safety and help protect property along the Sacramento River and its tributaries. While the original authorization approved the rehabilitation of 430,000 linear feet of levee, the 1974 Water Resources Development Act added 405,000 linear feet to the authorization and a 2007 bill authorized another 80,000 linear feet for a total of 915,000 linear feet of project. The Corps is set to release a Post Authorization Change Report, including an Environmental Impact Statement, to address the effects of the latest authorization. USACE, Sacramento District is responsible for implementation of the project in conjunction with its non-federal partner, the California Central Valley Flood Protection Board. A Final Post Authorization Change Report and EIS/EIR were released in April and March 2020, respectively	Impacts on Swainson's hawk, valley elderberry longhorn beetle, and other riparian species. Impacts on species foraging in affected agricultural lands.
San Francisco Bay to Stockton Deep Water Ship Channel Project	USACE, Port of Stockton, and Contra Costa County Water Agency	Planning phase	The San Francisco Bay to Stockton Deep Water Ship Channel Project is a congressionally authorized project being implemented by USACE, the Port of Stockton, and Contra Costa County Water Agency. A joint EIS/EIR will evaluate the action of navigational improvements to the Stockton Deep Water Ship Channel. A General Reevaluation Report and EIS, both released in January 2020, determined the feasibility of modifying the current dimensions of the West Richmond, Pinole Shoal, Suisun Bay, and Stockton Ship Channels, which are currently maintained to 35 feet and provide	Impacts on giant garter snake, western pond turtle, Swainson's hawk, largely temporary in nature.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			access to oil terminals, industry in Pittsburg, and the Port of Stockton. The proposed action consists of altering the depth of the deep draft navigation route.	
Sacramento Deep Water Ship Channel Project	U.S. Army of Corps of Engineers and Port of Sacramento	Planning phase (on hold)	The Sacramento River Deep Water Ship Channel Project is a Congressionally authorized project being implemented by USACE and the Port of Sacramento. The proposed project would complete the deepening and widening of the navigation channel to its authorized depth of 35 feet. Deepening of the existing ship channel is anticipated to allow for movement of cargo via larger, deeper draft vessels. Widening portions of the channel would increase navigational safety by increasing maneuverability. The 46.5-mile-long ship channel lies within Contra Costa, Solano, Sacramento, and Yolo counties and serves the marine terminal facilities at the Port of Sacramento. The Sacramento Deep Water Ship Channel joins the existing 35-foot-deep channel at New York Slough, thereby affording the Port of Sacramento access to San Francisco Bay Area harbors and the Pacific Ocean. The project has been on hold since 2014.	Impacts on giant garter snake, western pond turtle, Swainson's hawk, largely temporary in nature.
Agricultural Drainage Selenium Management Program Plan	Reclamation and San Luis & Delta-Mendota Water Authority	Ongoing	Impairment of water quality in the San Joaquin River, the Delta, and San Francisco Bay has resulted in the completion of a TMDL for selenium in the lower San Joaquin River, listing of the western Delta as having impaired water quality for selenium, and initiation of a TMDL study for selenium in North San Francisco Bay. The overall goal of the Agricultural Drainage Selenium Management Program is to minimize discharges of selenium in subsurface agricultural drainage from the western San Joaquin Valley to the river and downstream areas. Actions being taken include reduction in the generation of agricultural drainage containing elevated levels of selenium (through land and irrigation management practices) and limiting where and when the drainage water can be discharged	Potential beneficial effects on bird species that are part of the aquatic food chain.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
North American Waterfowl Management Plan	USFWS	Ongoing	<p>The North American Waterfowl Management Plan, a collaboration of Canada, the United States, and Mexico to enhance waterfowl populations, was originally written in 1986 and envisioned as a 15-year effort to achieve landscape conditions that could sustain waterfowl populations. The plan has been modified twice since the 1986 Plan to account for biological, sociological, and economic changes that influence the status of waterfowl and the conduct of cooperative habitat conservation.</p> <p>This 2018 Plan Update presents examples of progress toward achieving the goals of the 2012 Revision. It also establishes important groundwork for incorporating an understanding of people's relationship with nature into the North American waterfowl conservation enterprise.</p>	Beneficial effects on waterfowl and species using similar habitats.
Stone Lakes National Wildlife Refuge Comprehensive Conservation Plan	USFWS	Ongoing	<p>USFWS published a final Comprehensive Conservation Plan (CCP) for Stone Lakes National Wildlife Refuge in January 2007 to describe the selected alternative for managing Stone Lakes National Wildlife Refuge for the next 15 years. The refuge is located about 10 miles south of Sacramento, straddling I-5 and extending south from Freeport to Lost Slough. Under the plan, the Refuge will continue its focus of providing wintering habitat for migratory birds and management to benefit endangered species.</p> <p>Management programs for migratory birds and other Central Valley wildlife will be expanded and improved and public-use opportunities will also be expanded. The number of refuge units open to the public will increase from one to five. In addition, environmental education, interpretation, wildlife observation, wildlife photography, hunting, and fishing programs will be expanded. The plan achieves the refuge's purposes, vision, and goals; contributes to the Refuge System mission; addresses the significant issues and relevant mandates; and is consistent with principles of sound fish and wildlife management.</p>	Beneficial effects on terrestrial biological resources.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
West Sacramento Levee Improvements Program	West SAFCA and USACE	Ongoing	The West Sacramento Levee Improvements Program would construct improvements to the levees protecting West Sacramento to meet local and federal flood protection criteria. The program area includes the entire WSAFCA boundaries which encompasses portions of the Sacramento River, the Yolo Bypass, the Sacramento Bypass, and the Sacramento Deep Water Ship Channel. The levee system associated with these waterways includes over 50 miles of levees in Reclamation District (RD) 900, RD 537, RD 811, DWR's Maintenance Area 4, and the Deep Water Ship Channel. These levees surround the West Sacramento. For the purposes of this program, the levees have been generally divided into the nine reaches: Sacramento River Levee North, Sacramento River Levee South, Port North Levee, Port South Levee, South Cross Levee, Deep Water Ship Channel Levee East, Deep Water Ship Channel Levee West, Yolo Bypass Levee, and Sacramento Bypass Levee.	Potential impacts on species using agricultural areas for foraging, on riparian species, and aquatic species.
Yolo County Habitat/Natural Community Conservation Plan	Yolo Habitat Conservancy		<p>The Yolo Habitat Conservancy, a Joint Powers Authority, launched the Yolo Natural Heritage Program in March 2007. This effort includes the continuing preparation of a joint Habitat Conservation Plan/ Natural Community Conservation Plan (HCP/NCCP). Member agencies include Yolo County, City of Davis, City of Woodland, City of West Sacramento, and City of Winters.</p> <p>The HCP/NCCP describes the measures that local agencies will implement in order to conserve biological resources, obtain permits for urban growth and public infrastructure projects, and continue to maintain the agricultural heritage and productivity of the county. The nearly 653,549-acre planning area provides habitat for covered species occurring within five dominant habitats/natural communities. The plan proposes to address 12 covered species, including seven state-listed species: palmate-bracted birds beak, giant garter snake, Swainson's hawk, western yellow-billed cuckoo, and</p>	Beneficial effects on terrestrial biological resources.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			bank swallow. The Yolo Habitat Conservancy also consults regularly with CDFW and USFWS, as well as the Conservancy's Advisory Committee and other partners.	
Delta Science Plan	Delta Plan Interagency Implementation Committee (DPIIC)	Ongoing	The 2019 Delta Science Plan is the first comprehensive update to the 2013 Delta Science Plan. As with the 2013 document, the update process took on an open, transparent, and inclusive approach involving input from a diverse range of federal and state agencies, interested parties, academia, and the public. The actions identified in this updated Plan are intended to promote more forward looking and nimble science and management efforts. They address how to use open and transparent processes to prioritize science activities, determine how these can be carried out effectively and efficiently, and identify how the resulting information is best communicated to those who need it.	Generally beneficial to terrestrial biological resources.
Twitchell Island- San Joaquin Setback Levee Project	DWR	In progress	This project would stabilize a threatened section of levee along the San Joaquin River while also creating different habitat types waterside features to be constructed. In 2000, 2,200 linear feet of the waterside levee was re-contoured and replanted with native vegetation to create shaded riverine aquatic habitat. Additional riparian habitat, intertidal habitat, upland vegetation, and waterside beaches, benches, and undulations are planned in conjunction with an additional 23,000-foot setback along the San Joaquin River.	Beneficial effects on a variety of wildlife with potential for impacts on species during activities.
Twitchell Island Mitigation Enhancement Site	DWR	In progress	The Twitchell Island Mitigation Enhancement Site (TIMES) is currently in pre-project maintenance, with work on the planting plan and freshwater marsh to begin in 2022. After establishment, the TIMES project will contribute 110 advanced mitigation acres to Delta Levee Program participants, and the 70 enhancement acres will continue its current lease.	Beneficial effects on terrestrial biological resources.
Grizzly Slough Floodplain Project at the	DWR		The Grizzly Slough Floodplain Restoration Project, is one of two main elements of the North Delta Flood Control and Ecosystem Restoration	Potential impacts during construction but ultimately beneficial to species

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
Cosumnes River Preserve			Project that consists of flood management and habitat improvements where the Mokelumne River, Cosumnes River, Dry Creek and Morrison Creeks converge. Flood flows and high-water conditions in this area threaten levees, bridges, and roadways. The north Delta project will reduce flooding and provide contiguous aquatic and floodplain habitat along the downstream portion of the Cosumnes Preserve by modifying levees on Grizzly Slough. Benefits to ecosystem processes, fish and wildlife, will be achieved by recreating floodplain seasonal wetlands and riparian habitat on the Grizzly Slough proper. As of July 28, 2021, the grantee was securing final permits and subcontractors prior to construction.	using riparian and wetlands.
Lower Putah Creek Realignment	CDFW	In progress	One of six separate projects identified and implemented to carry out the RPA Actions in the 2009 NMFS BiOp specific to the Yolo Bypass.  The project will restore 300–700 acres of tidal freshwater wetlands, creating 5 miles of a new fish channel, improving anadromous fish access to 25 miles of stream, and restoring at least 5,000 square feet of salmon spawning habitat. Connectivity between these habitats will enhance salmonid in migration and spawning as well as rearing and outmigration conditions for smolts. The project will achieve this objective by enhancing habitat within Lower Putah Creek to support the recovery of local fall-run Chinook salmon, steelhead, and Sacramento splittail populations. This project has been identified as one of the projects that will be implemented under California EcoRestore.	Beneficial for aquatic species but potential impacts on upland species during grading.
Prospect Island Tidal Habitat Restoration Project	DWR and Department of Fish and Wildlife	In progress	The northern portion of Prospect Island (about 1,253 acres) is currently owned by DWR, who acquired the property with the intent of restoring freshwater tidal marshes and associated aquatic habitat. Consistent with the objectives for the refuge, the USACE and DWR completed the environmental documentation Mitigated Negative Declaration/Findings of No Significant	Beneficial effects on aquatic species.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			Impact for a restoration project on Prospect Island in 2001. This project would partially fulfill the 80,000-acre tidal habitat restoration obligation outlined in Reasonable and Prudent Alternative (RPA) 4 of the 2019 USFWS BiOp for the effects of long-term coordinated operations of the SWP and the federal Central Valley Project (CVP) on delta smelt and has been fully funded by the SWP contractors with several restoration activities in the planning process. The final EIR was certified in 2019.	
McCormack-Williamson Tract Flood Control and Ecosystem Restoration Project	DWR	Completed	This project is a part of the North Delta Flood Control and Ecosystem Restoration Project and will implement flood control improvements principally on and around McCormack-Williamson Tract in a manner that benefits aquatic and terrestrial habitats, species, and ecological processes. Flood control improvements are needed to reduce damage to land uses, infrastructure, and the Bay-Delta ecosystem caused by catastrophic levee failures in the Project study area. This project has been identified as one of the projects that will be implemented under California EcoRestore.	Beneficial effects on aquatic and terrestrial species, some impacts during construction.
Lookout Slough Tidal Habitat Restoration and Flood Improvement Project	DWR	In progress	The Project is designed to be a multi-benefit project to restore approximately 3,100 acres of tidal marsh, increase flood storage and conveyance in the Yolo Bypass, increase levee resilience, and decrease flood risk. Habitat restoration and flood improvement goals would be attained by excavating a network of tidal channels, constructing a new setback levee along Duck Slough, breaching and degrading the Shag Slough (Yolo Bypass West) Levee, breaching the Vogel Levee, and improving the Cache/Hass Slough Levee. On November 3, 2020, DWR certified the EIR for the Lookout Slough Tidal Habitat Restoration and Flood Improvement Project and filed a Notice of Determination with the Governor's Office of Planning and Research. On July 16, 2021, the Delta Stewardship Council, as part of an Appeals of the Certification of Consistency case,	Beneficial effects on aquatic species; potential impacts on terrestrial species during construction.



Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			remanded DWR on portions of the project which had not provide enough information to be shown as consistent with the Delta Plan. DWR is responsible for providing additional information. However, on July 27, 2021, approval of Permit No. 19477 was granted by the Central Valley Flood Protection Board under California Code of Regulations, Title 23, Article 3, Section 6 to construct approximately 2.9 miles of a new setback levee along Duck Slough and Liberty Island Road and breach the existing Yolo Bypass levee at Shag Slough. This permitted work would restore and enhance approximately 3,164 acres of upland, tidal, and floodplain habitat.	
Decker Island Tidal Habitat Restoration Project	DWR, CDFW	In progress	Decker Island is located in the Sacramento–San Joaquin River Delta along the Sacramento River. DWR is undertaking the restoration of the Decker Island Tidal Habitat Restoration Project in conjunction with CDFW to enhance roughly 140 acres of established emergent wetland with muted tidal connectivity to Horseshoe Bend, and uplands to fully tidal habitat. Construction began in August 2018 and was completed by mid-November of the same year. CDFW will implement biological monitoring to ensure desired site functions are established and to inform future restoration projects.	Beneficial effects on aquatic species.
SR-239 Project (East Bay – Contra Costa, Alameda, northern San Joaquin Counties)	Contra Costa Transportation Authority, Contra Costa County, Caltrans	Planning phase	The SR 239 project will provide a new, four-lane highway from SR 4 at Marsh Creek Road in Contra Costa County to I-580 in Alameda County. This new state route will ultimately improve the transportation network for an area that had few viable north-south roadway connections between East Contra Costa and the Central Valley.	Potential impacts on California red-legged frog, California tiger salamander, vernal pool fairy shrimp, and wildlife connectivity.
City of Antioch Brackish Water Desalination Project	City of Antioch	In development	The Antioch Brackish Water Desalination Project, which utilizes existing infrastructure to the extent possible, includes the construction of new desalination facilities and associated infrastructure, in order to improve the City's water supply reliability and operational flexibility. Once constructed the desalination facility, located at the existing water	No impacts on terrestrial biological resources.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			treatment plant, will provide for 6 million gallons per day of capacity (producing up to 5,500 AFY), helping the City reduce its purchases of more expensive CCWD water.	
Three Creeks Parkway Restoration Project	Contra Costa County Flood Control and Water Conservation District	In development	In July 2015, the District partnered with American Rivers, a non-profit partner, on the \$2 million Three Creeks Parkway Restoration Project in Brentwood, a multiagency public-private partnership to transform 1/4 mile of the Marsh Creek flood control channel into high-quality salmon and riparian habitat, with enhanced public access. Since then, the project has expanded to restore 3/4 mile of Marsh Creek and costs approximately \$9.0 million. Approximately \$5.9 million of outside funding from private, federal, and state agencies has been obtained to date. The project has multiple local and regional partners including the City of Brentwood, Friends of Marsh Creek Watershed, East Contra Costa County Habitat Conservancy, and East Bay Regional Park District. In 2018, planning and environmental studies were completed, and construction began in June 2020. Phase 1 has been completed.	Beneficial effects on riparian species.
Winter Island Tidal Habitat Restoration Project	DWR, CDFW	Completed	The Winter Island Tidal Habitat Restoration Project was created to partially fulfill the Fish Restoration Program (FRP)'s 8,000-acre tidal habitat restoration obligations of DWR in RPA 4 of the 2019 U.S. Fish and Wildlife Service (USFWS) Biological Opinion (BiOp) for the effects of the long-term coordinated operations of the SWP and the federal CVP on delta smelt. Because restoration of tidal habitat would provide access for salmonids rearing at Winter Island, the project is also consistent with RPA I.6.1 of the National Marine Fisheries Service (NMFS) Salmonid BiOp for SWP/CVP operations. These obligations were upheld in the 2019 Re-evaluation of Consultation published by USFWS and NMFS, with the addition that FRP now has until 2030 to reach these restoration goals. The project was also established to fulfill FRP's 800-acre mesohaline	Beneficial effects on riparian and wetland species.

Program/ Project	Agency	Status	Description of Program/Project	Impacts on Terrestrial Biological Resources
			habitat requirement of the California Department of Fish and Wildlife (CDFW) Longfin Smelt Incidental Take Permit for the SWP Delta operations. The primary goal of the project is to restore unrestricted tidal connectivity between the interior of Winter Island and the surrounding channels, which would convert muted tidal emergent wetland and open water habitats into tidal wetland habitat and improve access for the benefit of native fish species. Construction was completed on September 25, 2019.	

1 Caltrans = California Department of Transportation; cfs = cubic feet per second; CVP = Centra Valley Project; BiOp =  
 2 Biological Opinion; CDFW = California Department of Fish and Wildlife; DWR = California Department of Water  
 3 Resources; EBMUD = East Bay Municipal Utility District; EIR = Environmental Impact Report; EIS = Environmental Impact  
 4 Statement; EPA = U.S. Environmental Protection Agency; I = Interstate; NMFS = National Marine Fisheries Service;  
 5 Reclamation = Bureau of Reclamation; SR = State Route; SWP = State Water Project; USACE = U.S. Army Corps of  
 6 Engineers; USFWS = U.S. Fish and Wildlife Service.  
 7

8 The current conditions of study area biological resources are the byproduct of past and ongoing  
 9 human activity and natural processes. The present geographic range and condition of natural  
 10 communities, special-status and common plants and wildlife, and invasive species are described in  
 11 Section 13.1, *Environmental Setting*. A brief synopsis of general environmental conditions and their  
 12 evolution in the study area is presented in Section 13.1.1, *Study Area*. This discussion provides a  
 13 context of gradually declining acreages of natural habitat because of agricultural, urban  
 14 development, flood control and water management activities.

15 **13.3.4.2 Cumulative Impacts of the No Project Alternative**

16 The cumulative impacts with No Project Alternative scenario would include projects listed in Table  
 17 13-106 and would include other water supply projects that could be implemented if the Delta  
 18 Conveyance Project is not approved. Generally, many of these projects and programs are beneficial  
 19 to terrestrial biological resources while others could create temporary and permanent impacts on  
 20 biological resources. Other water supply projects that could be implemented under the No Project  
 21 Alternative scenario would not occur in the study area and would not be expected to contribute to  
 22 cumulative study area impacts on study area natural communities or species. Other water supply  
 23 projects outside the study area that could be implemented under the No Project Alternative have the  
 24 potential to affect special-status species, natural communities, wetlands, and waters of the United  
 25 States, and may combine to create cumulative biological resources in California. As other water  
 26 supply and management projects are implemented, biological resource impacts would be required  
 27 to be reduced by CEQA and permit requirements to compensate for, avoid, and minimize impacts,  
 28 which would reduce the potential for widespread cumulative impacts on biological resources.  
 29 Therefore, the potential for cumulative biological resources under the No Project Alternative is  
 30 considered to be less than significant and the No Project Alternative contribution would not be  
 31 cumulatively considerable.

### 1 **13.3.4.3 Cumulative Impacts of the Project Alternatives**

2 The various projects and programs listed in Table 13-106 will have cumulative effects on the  
3 existing terrestrial biological resources of the study area through project construction and beyond.  
4 The most relevant elements of these projects and programs are their ability to modify land use  
5 patterns, modify land management practices, and change the patterns of hydrology and vegetation  
6 in the study area. Most of the local, state, and federal land use and land management programs that  
7 are affecting or will affect the Delta are designed to preserve open space and agricultural lands, and  
8 to manage the resources of the area for multiple uses, including agriculture, recreation, fish and  
9 wildlife habitat, flood protection, and water management. The restoration programs will increase  
10 primarily wetland and riparian natural communities by converting agricultural land. The special-  
11 status and common plants and wildlife that rely on wetland and riparian habitats for some stage of  
12 their life will benefit from these changes over time. Other species that rely on agricultural land, but  
13 do not benefit from wetland and riparian expansion, may decline in the study area. On the upland  
14 fringes of the Delta, plans exist for small expansions of urban development that would remove  
15 primarily agricultural land uses. The management of state- and federally owned wildlife areas,  
16 including Sherman Island and Yolo Bypass State Wildlife Areas and Stone Lakes NWR, will continue  
17 to focus on multiple uses, including wildlife habitat improvement, public access for wildlife viewing,  
18 wildlife-friendly agricultural production, and hunting opportunities. Natural habitat will be  
19 improved and expanded. The principal changes that are likely to result from the various habitat  
20 conservation plans that overlap with the study area would be expected to include the restoration  
21 and protection of the habitats that support the same special-status species being addressed in this  
22 Draft EIR (see Impact BIO-54: *Conflict with the Provisions of an Adopted Habitat Conservation Plan,*  
23 *Natural Community Conservation Plan, or Other Approved Local, Regional, or State Habitat*  
24 *Conservation Plan*). These changes would be expected to result in increases of wetland, grassland,  
25 and riparian habitats, and a decrease in agricultural lands.

26 Implementation of the water management strategies associated with the programs listed in Table  
27 13-106 would not significantly modify the principal natural communities in the study area. These  
28 management strategies are designed, in part, to improve aquatic habitat conditions in the Delta for  
29 the benefit of special-status fish species. Periodic levee and channel maintenance activities  
30 associated with the flood management programs in Table 13-106 would result in localized  
31 disturbances to valley/foothill riparian, grassland, and tidal perennial aquatic natural communities,  
32 and to a lesser extent to tidal brackish and tidal freshwater emergent wetlands. To the extent that  
33 ongoing levee repair and replacement involves use of reinforcing rock and discouragement of  
34 replanting streamside vegetation, there could be a gradual decline in the extent and value of  
35 valley/foothill riparian habitat and grassland along minor and major waterways. Several of the  
36 water management and transportation projects listed in Table 13-106 require localized removal of  
37 natural communities and agricultural land for expanding infrastructure. Most of these activities are  
38 on the periphery or just outside of the study area.

39 The overall direction of these existing and ongoing programs and policies that influence land  
40 conversion and land management in the study area would continue to be toward maintaining the  
41 mix of agricultural, recreational, water management, and wildlife uses in the study area. Some  
42 actions that will occur will expand natural and manmade terrestrial and wetland habitats that will  
43 benefit the special-status and common plants and wildlife with expanded and enhanced habitat in  
44 the study area. The potential will remain, however, for long-term trends in levee deterioration,  
45 global climate change, and seismic activity that could damage levees and result in significant  
46 changes in natural communities and cultivated lands.

1 For all alternatives, the environmental commitments (Appendix 3B, *Environmental Commitments*  
2 *and Best Management Practices*), mitigation measures in this chapter, and CMP (Appendix 3F,  
3 *Compensatory Mitigation Plan for Special-Status Species and Aquatic Resources*) would reduce  
4 potential significant cumulative effects from the combined habitat losses and conversions due to  
5 project construction and restoration activities. The aforementioned measures would avoid and  
6 minimize construction, restoration, operations, and maintenance effects on terrestrial biological  
7 resources and would provide offsetting compensation (i.e., minimum ratio of 1:1) in the form of  
8 habitat conservation (restoration, enhancement, and protection) for permanent, and in some cases  
9 temporary, losses of habitat. Therefore, cumulative projects combined with the project alternatives  
10 would create less than significant cumulative impacts on biological resources and the project  
11 alternatives' contribution to cumulative impacts with compensatory mitigation, mitigation measures  
12 and environmental commitments incorporated would not be cumulatively considerable.