Chapter 10 Wildlife Resources

10.1 Introduction

This chapter describes the environmental setting, methods of analysis, and impact analysis for wildlife resources that would potentially be affected by the construction and operation of the Project. Wildlife resources are defined as special-status wildlife species (excluding fish) and the habitats on which they depend, migratory birds, colonies of non-special-status roosting bats, and wildlife corridors.

The study area for wildlife resources consists of areas of disturbance under all Project alternatives plus a 300-foot-wide buffer area. For operational impacts only, the study area for wildlife resources also includes the Sacramento River between the RBPP and the Delta. This area is referred to as the operations study area. Project components not included in the study area are offsite commercial quarries and existing roads that would provide construction access to the Project. The offsite quarries that would be aggregate sources for dam construction are not included in the study area for wildlife resources because the quarries are existing active locations. Obtaining aggregate from these offsite quarries during Project construction would not result in additional impacts on wildlife resources.

Tables 10-1a and 10-1b summarize the CEQA determinations and NEPA conclusions for construction and operation impacts, respectively, between alternatives that are described in the impact analysis.

Table 10-1a. Summary of Construction Impacts and Mitigation Measures for Wildlife Resources

Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Impact WILD-1: Substantial adverse effect (i.e., loss or removal), either directly or through habitat modifications, on wildlife species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.			
No Project	NI NE	-	NI NE
Alternative 1	S SA	**Mitigation Measure WILD-1.1:** Assess Habitat Suitability and Survey Suitable Habitat for Vernal Pool Branchiopods **Mitigation Measure WILD-1.2:** Avoid and Minimize Potential Effects on Vernal	LTSM NE

Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Pool Branchiopods and Western Spadefoot **Mitigation Measure WILD-1.3:** Compensate for Impacts on Occupied Vernal Pool Branchiopod Habitat **Mitigation Measure WILD-1.6:** Conduct Surveys for Suitable Valley Elderberry Longhorn Beetle Habitat **Mitigation Measure WILD-1.7:** Fence Elderberry Shrubs to be Protected **Mitigation Measure WILD-1.8:** Transplant Permanently Affected Elderberry Shrubs and Compensate for Loss of Valley Elderberry Longhorn Beetle and its Habitat **Mitigation Measure WILD-1.10:** Assess Habitat Suitability and Survey for Presence of Monarch Butterfly Nectar and Larval Host Plants **Mitigation Measure WILD-1.11:** Compensate for Loss of Monarch Butterfly Nectar and Larval Host Plants **Mitigation Measure WILD-1.12:** Assess Habitat Suitability and Survey for Presence of Crotch Bumble Bee and Western Bumble Bee Food Plants **Mitigation Measure WILD-1.13:** Compensate for Loss of Crotch Bumble Bee and Western Bumble Bee Habitat **Mitigation Measure WILD-1.14:** Assess Habitat Suitability and Survey Suitable Habitat for Western Spadefoot, California Red-legged Frog, and Western Pond Turtle **Mitigation Measure VEG-2.2:** Avoid and Compensate for Adverse Effects on Sensitive Natural Communities **Mitigation Measure VEG-3.2:** Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands	

Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Mitigation Measure WILD-1.15: Implement California Red-legged Frog Protective Measures **Mitigation Measure WILD-1.16:** Compensate for Permanent and Temporary Losses of Occupied California Red-legged Frog Aquatic and Upland Habitats **Mitigation Measure WILD-1.17:** Conduct Preconstruction Surveys for Western Pond Turtle and Monitor Initial In-Water Work **Mitigation Measure VEG-3.1:** Avoid and Minimize Disturbance of Wetlands and Non-Wetland Waters During Construction Activities **Mitigation Measure VEG-3.3:** Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters **Mitigation Measure WILD-1.18:** Implement Protective Measures for Giant Gartersnake **Mitigation Measure WILD-1.19:** Restore Temporarily Disturbed Giant Gartersnake Aquatic and Upland Habitat to Pre-Project Conditions **Mitigation Measure WILD-1.20:** Compensate for Permanent and Temporary Losses of Giant Gartersnake Aquatic and Upland Habitats **Mitigation Measure WILD-1.21:** Conduct Vegetation Removal during the Non-Breeding Season of Nesting Migratory Birds **Mitigation Measure WILD-1.22:** Conduct Preconstruction Surveys for Nesting Migratory Birds and Implement Protective Measures if Found **Mitigation Measure WILD-1.23:** Conduct Surveys for Western Burrowing Owl Prior to Construction and Implement	

Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Avoidance and Minimization Measures if Found **Mitigation Measure WILD-1.24:** Restore Temporarily Disturbed Habitat and Compensate for the Permanent Loss of Occupied Burrowing Owl Habitat **Mitigation Measure WILD-1.26:** Construct Overhead Power Lines and Associated Equipment Following Suggested Practices to Reduce Bird Collisions with Power Lines **Mitigation Measure WILD-1.27:** Conduct Focused Surveys for Golden Eagle and Bald Eagle and Implement Protective Measures if Found **Mitigation Measure VEG-4.1:** Avoid and Minimize Potential Adverse Effects on Oak Woodlands During Construction **Mitigation Measure VEG-4.2:** Compensate for Adverse Effects on Oak Woodlands **Mitigation Measure WILD-1.28:** Conduct Focused Surveys for Nesting Swainson's Hawk and White-tailed Kite Prior to Construction and Implement Protective Measures during Construction **Mitigation Measure WILD-1.29:** Compensate for the Permanent Loss of Foraging Habitat for Swainson's Hawk **Mitigation Measure WILD-1.30:** Conduct Surveys and Implement Protection Measures for Special-Status Bat Species Prior to Building/Structure Demolition **Mitigation Measure WILD-1.31:** Conduct Surveys and Implement Protection Measures for Special-Status Bat Species Prior to Tree Trimming and Removal **Mitigation Measure WILD-1.32:** Compensate for Permanent Impacts on Occupied Roosting Habitat	

Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Mitigation Measure WILD-1.33: Implement Protective Measures to Avoid and Minimize Potential Impacts on American Badger	
Alternative 2	S SA	Same as Alternative 1, plus: **Mitigation Measure WILD-1.4:** Evaluate and Survey Potential Habitat for Antioch Dunes Anthicid and Sacramento Anthicid Beetles and Implement Protective Measures **Mitigation Measure WILD-1.5:** Compensate for the Loss of Occupied Antioch Dunes Anthicid and Sacramento Anthicid Beetle Habitat	LTSM NE
Alternative 3	S SA	Same as Alternative 1	LTSM NE
Impact WILD-2: Substantial interference with the movement of a native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impediment of the use of native wildlife nursery sites			
No Project	NI NE	-	NI NE
Alternative 1	S SA	Same as for Impact WILD-1	SU SA
Alternative 2	S SA	Same as Alternative 1	SU SA
Alternative 3	S SA	Same as Alternative 1	SU SA
Impact WILD-3: Conflict with any local policies or ordinances protecting wildlife resources			
No Project	NI NE	-	NI NE
Alternative 1	S SA	Same as for Impacts WILD-1 and WILD-2	LTSM NE
Alternative 2	S SA	Same as Alternative 1	LTSM NE
Alternative 3	S SA	Same as Alternative 1	LTSM NE
Impact WILD-4: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan			
No Project	NI NE	-	NI NE

Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Alternative 1	S SA	Same as for Impact WILD-1	LTSM NE
Alternative 2	S SA	Same as Alternative 1	LTSM NE
Alternative 3	S SA	Same as Alternative 1	LTSM NE

Notes:
NI = CEQA determination of no impact
LTS = CEQA determination of less-than-significant impact
LTSM = CEQA determination of less than significant with mitigation
SU = CEQA determination of significant and unavoidable
B = NEPA conclusion of beneficial effects
NE = NEPA conclusion of no effect or no adverse effect
AE = NEPA conclusion of adverse effect
SA = NEPA conclusion of substantial adverse effect

Table 10-1b. Summary of Operation Impacts and Mitigation Measures for Wildlife Resources

Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Impact WILD-1: Substantial adverse effect (i.e., loss or removal), either directly or through habitat modifications, on wildlife species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.			
No Project	NI NE	-	NI NE
Alternative 1	S SA	**Mitigation Measure WILD-1.9:** Protect Special-status Invertebrates and their Host and Food Plants from Herbicide and Pesticide Use **Mitigation Measure WILD-1.25:** Protect Special-status Wildlife from Rodenticide Use	LTSM NE
Alternative 2	S SA	Same as Alternative 1	LTSM NE
Alternative 3	S SA	Same as Alternative 1	LTSM NE
Impact WILD-2: Substantial interference with the movement of a native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impediment of the use of native wildlife nursery sites			
No Project	NI NE	-	NI NE

Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Alternative 1	S SA	**Mitigation Measure WILD-2.1:** Design and Construct Wildlife Crossings for New Roadways at Suitable Locations **Mitigation Measure WILD-2.2:** Monitor and Maintain Wildlife Crossings	SU SA
Alternative 2	S SA	Same as Alternative 1	SU SA
Alternative 3	S SA	Same as Alternative 1	SU SA
Impact WILD-3: Conflict with any local policies or ordinances protecting wildlife resources			
No Project	NI NE	-	NI NE
Alternative 1	S SA	Same as for Impacts WILD-1 and WILD-2	LTSM NE
Alternative 2	S SA	Same as Alternative 1	LTSM NE
Alternative 3	S SA	Same as Alternative 1	LTSM NE
Impact WILD-4: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan			
No Project	NI NE	-	NI NE
Alternative 1	S SA	Same as for Impact WILD-1	LTSM NE
Alternative 2	S SA	Same as Alternative 1	LTSM NE
Alternative 3	S SA	Same as Alternative 1	LTSM NE

Notes:
NI = CEQA determination of no impact
LTS = CEQA determination of less-than-significant impact
LTSM = CEQA determination of less than significant with mitigation
SU = CEQA determination of significant and unavoidable
B = NEPA conclusion of beneficial effects
NE = NEPA conclusion of no effect or no adverse effect
AE = NEPA conclusion of adverse effect
SA = NEPA conclusion of substantial adverse effect

10.2 Environmental Setting

This section presents the methods for assessing wildlife resources in the study area, describes the habitats and wildlife commonly associated with each land cover type in the study area, and discusses the federally and state listed special-status wildlife species identified as potentially present in the study area. Table 10A-1 in Appendix 10A, *Special-status Wildlife Table and Non-listed Wildlife Species Accounts*, includes the status, habitat requirements, and likelihood of occurrence for the special-status species. The appendix also provides species accounts for non-special-status wildlife species with moderate to high potential to occur in the study area. Appendix 10B, *Wildlife Habitat Models and Methods*, contains special-status species model descriptions.

10.2.1. Methods for Assessing Wildlife Resources in the Study Area

Potential wildlife resources in the study area were evaluated by reviewing existing information and identifying potentially suitable habitat with geographic information system (GIS) modeling. Property access restrictions precluded field surveys of wildlife resources in the study area since the preparation of the 2017 Draft EIR/EIS. Previous surveys to characterize habitat and wildlife communities and for focused surveys for groups of wildlife species (i.e., amphibians and reptiles, birds, and mammals) were conducted from 1998 to 2004 and in 2010 to 2011. Results of these surveys were reported in the 2017 Draft EIR/EIS and are not included in this chapter. Limited information from January 2021 focused bird surveys conducted for geotechnical boring investigations for the Project is reported in Appendix 10A. The following information was reviewed.

- California Natural Diversity Database (CNDDB) search results for occurrences of special-status wildlife species (defined in Section 10.2.3) within 5 miles of the study area (Appendix 9A, *Special-Status Plant Species*) (California Department of Fish and Wildlife 2021a).
- An unofficial endangered and threatened species list for the study area, obtained from the Information, Planning, and Consultation (IPaC) website (Appendix 9A) (U.S. Fish and Wildlife Service 2021).
- Historical and recent (i.e., 2020) aerial imagery of the study area in Google Earth Pro.
- Species distribution, habitat association, and habitat requirement information from numerous sources cited in this chapter and Appendices 10A and 10B.
- California Essential Habitat Connectivity Project (Spencer et al. 2010).

Potentially suitable habitat for special-status wildlife species in the study area was determined based on scientific literature and GIS modeling. Available literature was reviewed to identify known habitat associations and habitat requirements for each species. These requirements were then compared with the existing land cover types mapped in the study area, and a series of assumptions were made regarding which land cover types could provide potentially suitable habitat for each species based on its habitat requirements. The land cover types associations,

model assumptions and rationales are in the species model descriptions (Appendix 10B). Using the assumptions and rationales from the model descriptions, a list of potentially suitable land cover types was created for each species, which was then modeled using GIS software to identify areas of potential habitat for most species in the study area (models were not created for a few species). Because the models are limited in part by the accuracy of aerial imagery interpretation and the inability to field verify the land cover mapping, they may over- or underestimate the amount of potential habitat in the study area for one or more species.

10.2.2. Land Cover Types and Associated Wildlife

The study area and vicinity are predominantly vegetated by natural and agricultural vegetation. Aerial imagery interpretation was primarily used to map the land cover types in the study area. The land cover types identified in the study area are shown in Figure 9B-1 in Appendix 9B, *Vegetation and Wetland Methods and Information*, and are listed in Table 9B-1, which also provides acreage estimates for each type. The habitats and wildlife commonly associated with each land cover type are described below.

10.2.2.1. Annual Grassland

Annual grassland is the dominant land cover type in the study area. Annual grasslands are used by many wildlife species for foraging. Some of these species also inhabit annual grassland if special features such as cliffs, caves, ponds, or woody plants are available for breeding or resting habitat, or as escape cover. Reptiles that breed in annual grassland habitats include western fence lizard (*Sceloporus occidentalis*), common garter snake (*Thamnophis sirtalis*), and northern pacific rattlesnake (*Crotalus oreganus oreganus*). Grasslands provide foraging habitat for wide-ranging species such as red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), American kestrel (*Falco sparverius*), and northern harrier (*Circus hudsonius*). Mammals typically found in this habitat include California vole (*Microtus californicus*), western harvest mouse (*Reithrodontomys megalotis*), California ground squirrel (*Otospermophilus beecheyi*), black-tailed hare (*Lepus californicus*), coyote (*Canis latrans*), and American badger (*Taxidea taxus*) (California Department of Fish and Wildlife 2021b). In addition, many species that nest or roost in open woodlands may forage in associated grasslands, including western bluebirds (*Sialia mexicana*), western kingbirds (*Tyrannus verticalis*), and some species of bats (Zeiner et al. 1990a:428, 510; 1990b).

10.2.2.2. Barren

The barren land cover type is characterized by areas where vegetation cannot grow. Barren was mapped in one location in the study area in a landslide on a hillslope where vegetation was not present. Because of the lack of vegetation, barren ground has a limited use by wildlife. However, some species, such as western burrowing owl (*Athene cunicularia*) and California horned lark (*Eremophila alpestris actia*), prefer areas with limited or very low-growing vegetation.

10.2.2.3. Blue Oak Woodland

The blue oak woodland vegetation community, dominated by blue oak, is the most common vegetation in the low foothills of the western portion of the study area. Oak woodlands are

important habitats because of their high value to wildlife in the form of nesting sites, cover, and food (California Department of Fish and Wildlife 2021b). Birds associated with oak woodlands include acorn woodpecker (*Melanerpes formicivorus*), western scrub jay (*Aphelocoma californica*), yellow-billed magpie (*Pica nuttalli*), and many warblers and flycatchers (Zeiner et al. 1990a:376, 452, 460). Cavities in oak trees are important nesting sites for acorn woodpecker, oak titmouse (*Baeolophus inornatus*), Bewick's wren (*Thryomanes bewickii*), and western bluebird (California Partners in Flight 2002:24). Oak woodlands provide nesting sites and/or foraging habitat for raptors, such as red-tailed hawk, red-shouldered hawk (*Buteo lineatus*), and great-horned owl (*Bubo virginianus*) (Zeiner et al. 1990a:132, 136, 326; California Partners in Flight 2002:24). Mammals associated with oak woodlands include western gray squirrel (*Sciurus griseus*), pallid bat (*Antrozous pallidus*), bobcat (*Lynx rufus*), mule deer (*Odocoileus hemionus*), and gray fox (*Urocyon cinereoargenteus*) (Zeiner et al. 1990b:70, 146, 324, 352). Acorns are an important food source for species such as California quail (*Callipepla californica*), wild turkey (*Meleagris gallopavo*), western gray squirrel, and mule deer (California Department of Fish and Wildlife 2021b).

10.2.2.4. Canal

Canals occur throughout the lower elevation portions of the study area in agricultural areas. Canals, including the TC Canal, GCID Main Canal, and CBD, were defined as constructed channels used for irrigation that may be earth- or concrete-lined. Most canals are subject to ongoing maintenance, including vegetation removal. Wildlife use of canals depends on several factors, including the extent of vegetation in and along the canal, whether the canal is concrete lined, the period of time that water remains in the canal, and the velocity of flow. Concrete-lined canals or those with high flow velocities typically have low value for wildlife, although large canals with slower flows can be used by waterfowl.

10.2.2.5. Chamise Chaparral

The chamise chaparral community is uncommon in the study area and is concentrated along South Road in the western portion where it is the dominant vegetation. Chaparral provides habitat for a variety of birds and mammals. Numerous rodents, deer, and other herbivores are common in chaparral communities. Rabbits and hares will eat twigs, evergreen leaves, and bark from chaparral in fall and winter when there isn't an abundance of grasses. Shrubby vegetation provides mammals with cover and shade during hot weather and protection from wind in the winter. Chaparral provides seeds, fruits, insects, protection from predators and the weather, in addition to singing, roosting, and nesting sites for many species of birds (California Department of Fish and Wildlife 2021b). California quail, Bewick's wren (*Thryomanes bewickii*), wrentit (*Chamaea fasciata*), California thrasher (*Toxostoma redivivum*), black-tailed hare, brush mouse (*Peromyscus boylii*), dusky-footed woodrat (*Neotoma fuscipes*), and black-tailed deer (*Odocoileus hemionus columbianus*) are common in chaparral habitats (Zeiner et al. 1990a, 1990b).

10.2.2.6. Developed

Developed areas are generally paved or covered with an impermeable substrate (i.e., asphalt, concrete). Structures in developed areas may provide suitable roosting habitat for bats or nesting habitat for birds. Roadways and other paved surfaces do not provide habitat for wildlife.

10.2.2.7. Disturbed

Disturbed areas are regularly compacted but still have a permeable surface. Because these areas are typically subject to disturbance from human activity on a regular basis, they provide low-quality habitat for wildlife. Wildlife species commonly found in urban areas are also found in disturbed areas. Such species may include Brewer's blackbird (*Euphagus cyanocephalus*), house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), yellow-billed magpie, mourning dove (*Zenaida macroura*), Virginia opossum (*Didelphus virginiana*), and striped skunk (*Mephitis mephitis*) (Zeiner et al. 1990a:310, 460, 646, 668, 682; Zeiner et al.1990b:2, 316). American kestrel and red-tailed hawk frequently forage in this habitat (Zeiner et al. 1990a:136, 144).

10.2.2.8. Ditch

Ditches are defined as earth-lined, constructed channels used for irrigation or drainage, including roadside drainages, and are present throughout the study area in the lower elevation agricultural areas. Most ditches are subject to ongoing maintenance, including vegetation removal. Wildlife use of ditches is dependent on several factors including the extent of vegetation in and along the ditch, the period of time that water remains in the ditch, and the velocity of flow. Ditches with high flow velocities typically have low value for wildlife. Ditches with vegetation in the channel and along the banks and an adequate duration of water can provide food, water, cover, and dispersal corridors for various wildlife species, such as Sierran treefrog (*Pseudacris sierra*), California newt (*Taricha torosa*), great egret (*Ardea alba*), raccoon (*Procyon lotor*), and striped skunk. The banks of ditches could be used by California ground squirrel and western fence lizard.

10.2.2.9. Ephemeral Stream

Ephemeral streams occur throughout the Antelope Valley and surrounding hills. These unnamed features convey flows only during and immediately after rainfall events. Ephemeral streams provide temporary sources of water for several common wildlife species but do not provide breeding habitat for amphibians. The banks of the channels may be used by California ground squirrels, western fence lizards, and gopher snakes (*Pituophis melanoleucus*).

10.2.2.10. Foothill Pine

Foothill pine occurs only in the western part of the study area along the South Road alignment. A large variety of wildlife species breed in foothill pine habitat, although no species is completely dependent on it for breeding, feeding, or cover. Most species utilizing this habitat breed during late winter and early spring (California Department of Fish and Wildlife 2021b). Blue oak-foothill pine woodland habitat provides forage opportunities for a variety of bird species that feed on acorns, bark, and foliage insects. Primary cavity-nesting birds (e.g., woodpeckers)

excavate nest holes in living and dead trees, which are subsequently used by other cavity-nesting species such as the American kestrel, white-breasted nuthatch (*Sitta carolinensis*), and western bluebird. Other species that may occur in this habitat include wild turkey, oak titmouse, and western gray squirrel (Zeiner et al. 1990a and 1990b).

10.2.2.11. Forested Wetland

Forested wetlands (i.e., riparian forest) occur in one segment of Willow Creek (northeast of Willows) and in segments of Antelope Creek, Stone Corral Creek, Grapevine Creek, Funks Creek, and unnamed intermittent streams that are tributary to these creeks, as well as at the edge of a pond southwest of Funks Reservoir. When the vegetation is diverse and well developed, riparian forest provides high value habitat for wildlife, including several special-status species. Riparian forest habitat provides food, water, and migration and dispersal corridors, as well as escape, nesting, and thermal cover for many wildlife species (California Department of Fish and Wildlife 2021b). Invertebrates, amphibians, and aquatic reptiles live in aquatic and adjacent upland habitats. Raptors, herons, egrets, and other birds nest in the upper canopy. A variety of songbirds use the shrub canopy, and cavity-nesting birds, such as Nuttall's woodpecker (*Picoides nuttallii*), and oak titmouse, occupy dying trees and snags (Zeiner et al. 1990a:388, 472). Several mammals including raccoon, Virginia opossum, and striped skunk are common in riparian habitats (Zeiner et al. 1990b:2, 298, 316).

10.2.2.12. Freshwater Marsh

Freshwater marsh occurs at the saturated edges of riparian vegetation, ponds (including Salt Lake), seasonal wetlands, Funks Reservoir, Stone Corral Creek, GCID Main Canal near the Sacramento River at the RBPP, and unnamed intermittent streams. Most irrigation ditches and agricultural field edges are regularly maintained, and freshwater marsh is infrequently in ditches. Freshwater marsh provides food, cover, and water for a variety of amphibians, reptiles, birds, and mammals. (California Department of Fish and Wildlife 2021b). Wildlife species that use freshwater marsh habitat include Sierran treefrog, western aquatic gartersnake (*Thamnophis couchi*) (Zeiner et al. 1988:78, 216), great blue heron (*Ardea herodias*), great egret, Virginia rail (*Rallus limicola*), and red-winged blackbird (*Agelaius phoeniceus*) (Zeiner et al. 1990a:32, 34, 176, 638).

10.2.2.13. Hayfield

The largest areas of hayfields in the study area are located on the Antelope Valley floor. Alfalfa fields are included with this land cover type. Hayfield provides high-quality seasonal habitat for reptiles (e.g., gopher snakes, king snakes [*Lampropeltis californiae*]), birds (e.g., blackbirds, doves, egrets, hawks, owls, sandhill cranes, waterfowl), and mammals (gophers, voles, deer, elk [*Cervus canadensis*], fox [*Vulpia* spp.]). However, when hayfields are harvested repeatedly, reproduction values for ground-nesting birds are reduced to zero. If rotational cropland is adjacent to hayfields, the hayfields can provide cover during seasonal disking and planting on the rotated fields. (California Department of Fish and Wildlife 2021b). Alfalfa is also high-quality wildlife habitat because it provides nesting cover, abundant insects, and feeding opportunities throughout the year due to its perennial growth pattern. Many types of insects and vertebrate herbivores, such as gophers and rabbits, feed in alfalfa fields. The insect and vertebrate

herbivores are then prey for songbirds, migratory birds, raptors, foxes, snakes, and lizards. Deer, antelope, and elk commonly feed in alfalfa fields, especially in times of drought. Swainson's hawk (*Buteo swainsoni*) and other raptors can be found hunting in alfalfa fields (Agronomy Research and Information Center 2021).

10.2.2.14. Intermittent Stream

There are numerous intermittent streams in the study area, including Willow Creek, Stone Corral Creek, Lurline Creek, Grapevine Creek, Wilson Creek, tributaries to these creeks, and many unnamed streams. Segments of Hunters Creek, Funks Creek, and Antelope Creek also have intermittent flows. Intermittent streams have the most water flow during the wet season and may contain pools that remain inundated into late summer. Intermittent streams have a more limited use by wildlife species than perennial streams because of their restricted flows. When flowing or when pools are present, these streams may provide sources of drinking water for birds and mammals and may provide movement corridors for some species of amphibians.

10.2.2.15. Managed Wetland

Managed wetlands in the study area include created wetlands in a mitigation area on the west side of the CBD. Wildlife species and habitat use for managed wetland are similar to those described for freshwater marsh.

10.2.2.16. Mixed Chaparral

Mixed chaparral is generally found in the western and southern portions of the study area at elevations ranging from 800–1,800 feet. Wildlife species and habitat use for mixed chaparral are similar to those described for chamise chaparral.

10.2.2.17. Oak Savanna

Oak savanna in the study area can be found on gently sloping hills and occasionally on terraces and valley floors. Wildlife species and habitat use for oak savanna are similar to those described for annual grassland and blue oak woodland.

10.2.2.18. Orchard

Orchards in the study area are located east of Funks Reservoir on the Central Valley floor. Orchards are typically planted on deep fertile soils that supported diverse and productive natural habitats in the past. Orchards can provide shade or water, if irrigated, for wildlife. Deer may browse on trees. Orchards may provide cover and nesting sites for various species of birds including mourning dove and California quail. California ground squirrels may also feed on nuts in orchards. Birds that commonly feed on almonds and walnuts are northern flicker (*Colaptes auratus*), western scrub jay, American crow, oak titmouse, Brewer's blackbird, and house finch. Birds that frequently feed on orchard fruit include yellow-billed magpie, western bluebird, American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottos*), cedar waxwing (*Bombycilla cedrorum*), and Bullock's oriole (*Icterus bullockii*). (California Department of Fish and Wildlife 2021b). Western red bat (*Lasiurus blossevillii*) has been found roosting in fruit and nut orchards (Pierson et al. 2006:12, 15).

10.2.2.19. Ornamental Woodland

Ornamental woodlands in the study area are stands of nonnative trees that have been planted around buildings or agricultural lands. Ornamental woodland provides a location where animals can escape, nest, and obtain thermal cover. Common and special-status birds may perch or nest in stands of nonnative woodland. Common mammals such as raccoon, Virginia opossum, and striped skunk may take cover in nonnative woodland. Foliage roosting bats, such as western red bat and hoary bat (*Lasiurus cinereus*) may roost in the foliage of nonnative woodland trees.

10.2.2.20. Perennial Stream

Several streams in the study area carry water year-round and are considered perennial streams, including the Sacramento River; Hunters Creek, including a realigned segment and several tributaries that carry water from the GCID Main Canal through areas of rice fields; Stone Corral Creek, downstream of the confluence with Antelope Creek; most of Antelope Creek; and most of Funks Creek. Perennial streams with adjacent riparian or emergent wetland vegetation, provide food, water, and migration and dispersal corridors, as well as escape, nesting, and thermal cover for a variety of wildlife and fish species. The open water areas of large rivers and creeks provide resting and escape cover for many species of waterfowl and other waterbirds. Insectivorous birds, such as swallows, swifts, and flycatchers catch insects over open water areas. The river shore and shallow water areas provide foraging opportunities for waterfowl, herons, and shorebirds. (California Department of Fish and Wildlife 2021b). Other wildlife species that may use the riverine habitat and/or associated riparian habitat include western pond turtle (*Actinemys marmorata*) (Zeiner et al. 1988:100), river otter (*Lutra canadensis*), raccoon, and striped skunk (Zeiner et al. 1990b:298, 316, 318).

10.2.2.21. Pond

There are numerous ponds in the Antelope Valley and surrounding hills, as well as one detention basin in the Dunnigan Pipeline alignment. Ponds provide habitat for several species of amphibians including Sierran treefrog, California newt, and California toad (*Anaxyrus boreas halophilus*), and aquatic reptiles such as western pond turtle and valley gartersnake (*Thamnophis sirtalis fitchi*). Freshwater marsh vegetation is commonly associated with ponds and provides cover habitat for these species, and may provide cover, resting, or breeding habitat for various bird species. Bats and insectivorous birds may drink from and forage over ponds, and other mammal species may use ponds as a source of water.

10.2.2.22. Reservoir

Funks Reservoir is the only reservoir in the study area. Reservoirs provide habitat for a variety of amphibians, reptiles, birds, and mammals for reproduction, food, water, or cover (California Department of Fish and Wildlife 2021b). Various species of ducks and geese inhabit reservoirs, and other birds such as herons and belted kingfishers (*Megaceryle alcyon*) forage along the water's edge. Many species of insectivorous birds, including barn swallow (*Hirundo rustica*), cliff swallow (*Petrochelidon pyrrhonota*), and black phoebe (*Sayornis nigricans*), catch their prey over open water (Zeiner et al. 1990a). Bald eagles feed on fish and some birds associated with reservoirs (California Department of Fish and Wildlife 2021b).

10.2.2.23. Rice

Rice is the most dominant agricultural type in the easternmost portion of the study area. Flooded rice fields provide freshwater wetlands for a variety of wetland-associated wildlife, including shorebirds, wading birds, and gulls (California Department of Fish and Wildlife 2021b). Wildlife species associated with flooded rice fields include great egret, white-faced ibis (*Plegadis chihi*), snow goose (*Chen caerulescens*), northern pintail (*Anas acuta*), black-necked stilt (*Himantopus mexicanus*), and greater yellowlegs (*Tringa melanoleuca*) (Zeiner et al. 1990a:34, 44, 52, 66, 198, 203). Rice fields and associated irrigation ditches also provide suitable habitat for giant gartersnake (*Thamnophis gigas*) (U.S. Fish and Wildlife Service 2015a).

10.2.2.24. Row Crops

Row crops are mostly scattered in the eastern portion of the study area on the valley floor. Agricultural lands (including row crops) are established on fertile soils that historically supported abundant wildlife. The quality of habitat for wildlife is greatly diminished when the land is converted to agricultural uses and is intensively managed. Many species of rodents and birds have adapted to agricultural lands, but they are often controlled by fencing, trapping, and poisoning to prevent excessive crop losses (California Department of Fish and Wildlife 2021b). Wildlife species that may be associated with row crops include mourning dove, American crow (*Corvus brachyrhynchos*), Brewer's blackbird, sandhill crane (*Grus canadensis*), raptors, egrets, and rodents.

10.2.2.25. Ruderal

Ruderal areas are mostly scattered in the eastern portion of the study area on the valley floor. Ruderal refers to weedy or disturbed conditions including areas surrounding residences, out-buildings, and stockyards. Depending on the size and location of ruderal areas, wildlife species and habitat use for ruderal are similar to those described above for annual grassland (larger areas or near other natural land cover types) or disturbed (smaller areas or near developed areas).

10.2.2.26. Scrub-Shrub Wetland

Scrub-shrub wetland is present along Willow Creek and Grapevine Creek (intermittent streams); perennial streams, including Sacramento River, Stone Corral Creek, Antelope Creek, and Funks Creek; Funks Reservoir; edges of ponds; and irrigation and drainage ditches with enough water supply to support woody vegetation. Scrub-shrub wetland provides cover, a place to escape, and nesting substrate for a variety of animals. Songbirds perch and nest in the woody vegetation and other birds such as red-winged blackbird and Virginia rail may use the emergent vegetation for cover and nesting (Zeiner et al. 1990a:176, 638). Because the vegetation in scrub-shrub wetlands is dependent on long-term sources of water, open water associated with scrub-shrub wetland provides habitat for amphibians and aquatic reptiles, including western pond turtle and giant gartersnake.

10.2.2.27. Seasonal Wetland

Seasonal wetlands occur throughout the study area in isolated depressions in annual grassland, as well as in association with other wetlands and non-wetland waters, such as freshwater marsh,

ponds, and streams. Some of the seasonal wetlands in the study area would be considered vernal pools, because they have higher species diversity and support native or obligate-wetland species (California Department of Water Resources 2000). Several seasonal wetlands northwest of Funks Reservoir are alkali wetlands. Seasonal wetlands and vernal pools provide unique habitat for a variety of aquatic invertebrates that are food for other wildlife species, including great blue heron, killdeer (*Charadrius vociferus*), American avocet (*Recurvirostra americana*), black-necked stilt, and greater yellowlegs (Zeiner et al. 1990a:32, 192, 200, 202). In addition, amphibians such as Sierran treefrog, western spadefoot (*Spea hammondii*), and California toad use vernal pools and seasonal swales for breeding and feeding (Zeiner et al. 1988:56, 64, 78).

10.2.2.28. Upland Riparian

Riparian vegetation in the study area is associated with intermittent and perennial stream corridors and floodplain terraces, although most of the riparian areas are narrow and degraded by cattle use. Well-developed, native riparian vegetation occurs in small remnant patches along foothill portions of the larger creeks in the study area. The largest concentration of riparian habitat is in the southern portion of the inundation area along Antelope Creek. One large stand of upland riparian also occurs along the Sacramento River at the end of the Dunnigan Pipeline alignment. Wildlife species and habitat use for upland riparian are similar to those described for forested wetland.

10.2.2.29. Vineyard

Small portions of two individual vineyards are located in the northern portion of the study area on the outer edges of the city of Willows and in the southern portion of the study area along the Dunnigan Pipeline alignment. Wildlife species and habitat use for vineyard are similar to those described for orchard and row crops.

10.2.3. Special-Status Wildlife Species

For the purpose of this chapter, special-status wildlife are animals that are legally protected under the Endangered Species Act (ESA), the California Endangered Species Act (CESA), or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such listing.

Special-status wildlife are those animals in any of the following categories:

- Species listed or proposed for listing as threatened or endangered under ESA (50 Code of Federal Regulations [CFR] 17.11 [listed animals] and various notices in the Federal Register [FR] [proposed species]).
- Species that are candidates for possible future listing as threatened or endangered under ESA (85 FR 73164 [November 16, 2020]).
- Species listed or proposed for listing by the State of California as threatened or endangered under CESA (14 California Code of Regulations 670.5).

- Animal species of special concern identified on the Special Animals List by California Department of Fish and Wildlife (CDFW) (California Department of Fish and Wildlife 2021c).
- Animals fully protected in California (California Fish and Game Code Section 3511 [birds], 4700 [mammals], 5050 [amphibians and reptiles], and 5515 [fish]).
- Animals that are considered biologically rare, very restricted in distribution, or declining throughout their range, as determined by the scientific community (such as the Western Bat Working Group) and/or identified on the CDFW Special Animals List (California Department of Fish and Wildlife 2021c).

Forty-one special-status wildlife species occur in or within 5 miles of the study area or have suitable habitat in the study area and were evaluated for their potential to occur in the study area (Table 10A-1 in Appendix 10A).

Based on a review of species distribution and habitat requirements and land cover types in the study area, eight of the 41 species are not expected to occur in the study area because the area lacks suitable habitat for the species or is outside the species' known range. Table 10A-1 provides an explanation for the absence of each of these species from the study area. These eight species are not addressed further. Federally listed, state listed, and fully protected species (13 species) that have potential to occur in the study area are discussed below. Non-listed and non-fully-protected species (20 species) are discussed in Appendix 10A.

10.2.3.1. Conservancy Fairy Shrimp

Status and Distribution

Conservancy fairy shrimp is federally listed as endangered (59 FR 48136–48153). Historically, Conservancy fairy shrimp was probably found in suitable vernal pool habitats throughout much of the Central Valley and southern coastal regions of California (U.S. Fish and Wildlife Service 2005a:II-181). Except for one population along the Central Coast in Ventura County, all current locations of Conservancy fairy shrimp are in the Central Valley (U.S. Fish and Wildlife Service 2012:3).

Habitat Requirements and Biology

Conservancy fairy shrimp primarily occurs in large turbid vernal pools (playa pools) that stay inundated for much longer than typical vernal pools, often into summer (Eriksen and Belk 1999:88, U.S. Fish and Wildlife Service 2012:3). Conservancy fairy shrimp has been found in vernal pools on a variety of landforms, geologic formations, and soil types (U.S. Fish and Wildlife 2005a:II-183) and within a wide elevation range (16 to 5,577 feet) (Eriksen and Belk 1999:88).

Similar to other vernal pool branchiopods, Conservancy fairy shrimp is adapted to the environmental conditions of its ephemeral vernal pool habitats. These adaptations include the ability of fairy shrimp cysts to remain dormant in the soil when vernal pool habitats are dry. Fairy shrimp are also able to complete their lifecycle (from cyst hatching to reproducing) within

the relatively short time period when vernal pools are inundated with water (U.S. Fish and Wildlife Service 2005a:II-195). Differences in the rate of maturation and reproduction of vernal pool branchiopods are thought to be the result of variations in water temperature (Helm 1998:134).

Occurrence in and Near the Study Area

There are no recorded occurrences of Conservancy fairy shrimp in the study area (California Department of Fish and Wildlife 2021a). There is one known occurrence of Conservancy fairy shrimp at the Sacramento National Wildlife Refuge, approximately 1.5 miles from the study area (California Department of Fish and Wildlife 2021a). Potentially suitable habitat for this species in the study area consists of the seasonal wetland and ditch land cover types when adjacent to or surrounded by annual grassland.

10.2.3.2. Vernal Pool Fairy Shrimp

Status and Distribution

Vernal pool fairy shrimp is federally listed as threatened (59 FR 48136–48153). Vernal pool fairy shrimp is known to occur in a wide range of vernal pool habitats in the southern and Central Valley areas of California (U.S. Fish and Wildlife Service 2005a:II-192). The species is currently found in fragmented habitats across the Central Valley of California from Shasta County to Tulare and Kings Counties, in the central and southern Coast Ranges from Napa County to Los Angeles County, and inland in western Riverside County, California (U.S. Fish and Wildlife Service 2005a:II-193; 2007a:17).

Habitat Requirements and Biology

Vernal pool fairy shrimp commonly inhabit vernal pools or vernal pool-like habitats, typically in grassland landscapes. Most frequently, vernal pool fairy shrimp are found in vernal pools or vernal swales, in unplowed grasslands (Eng et al. 1990:257). Vernal pool fairy shrimp sometimes occur in other wetlands that provide habitat characteristics similar to those of vernal pools; these other wetlands include alkaline rain pools, rock outcrop pools, and some disturbed and constructed sites, including tire ruts, ditches, and puddles (59 FR 48136–48153; Eriksen and Belk 1999:93; Helm 1998:129–130; U.S. Fish and Wildlife Service 2007a:24, 58). Occupied habitats range in size from 6-square-foot puddles to pools exceeding 24 acres (Eriksen and Belk 1999:93). Vernal pool fairy shrimp is not found in riverine, marine, or other permanent waters (U.S. Fish and Wildlife Service 2007a:4). Suitable pools must stay inundated long enough for the shrimp to complete their life cycle.

Vernal pool fairy shrimp matures very quickly and can have multiple clutches of eggs per lifespan (Eriksen and Belk 1999:93). In a study using large plastic pools to simulate natural vernal pools, Helm (1998:133) found that vernal pool fairy shrimp reached maturity in an average of 18 days following hatching and reproduced an average of 40 days after hatching. Differences in the rate of maturation and reproduction of vernal pool branchiopods are thought to be the result of variations in water temperature (Helm 1998:134).

Occurrence in and Near the Study Area

There are no recorded occurrences of vernal pool fairy shrimp in the study area (California Department of Fish and Wildlife 2021a). There are several records for vernal pool fairy shrimp occurrences at the Sacramento National Wildlife Refuge, approximately 2.75–3.75 miles from the study area. There are also records for occurrences near the RBPP, the closest being approximately 1.2 miles northwest of the pumping plant (California Department of Fish and Wildlife 2021a). Potentially suitable habitat for this species in the study area consists of the seasonal wetland and ditch land cover types when adjacent to or surrounded by annual grassland.

10.2.3.3. Vernal Pool Tadpole Shrimp

Status and Distribution

Vernal pool tadpole shrimp is federally listed as endangered (59 FR 48136–48153). The historical range of vernal pool tadpole shrimp likely consisted of the Central Valley and Central Coast regions of California (U.S. Fish and Wildlife Service 2005a:II-204). Vernal pool tadpole shrimp presently occurs sporadically in the Central Valley from Shasta County to northwestern Tulare County and the San Francisco Bay area (U.S. Fish and Wildlife Service 2005a:II-204-205; 2007b:4).

Habitat Requirements and Biology

Vernal pool tadpole shrimp occurs in a variety of seasonal habitats, including vernal pools and other seasonal pools, ponded clay flats, roadside ditches, and stock ponds (Helm 1998:132; Rogers 2001:1002). Habitats where vernal pool tadpole shrimp have been observed range in size from small (less than 25 square feet), clear, vegetated vernal pools to large (more than 80 acres) winter lakes (Helm 1998:133). Vernal pool tadpole shrimp produce cysts (eggs) that lie in the soil until the next winter rains trigger the eggs to hatch (U.S. Fish and Wildlife Service 2007b:3).

In the laboratory, vernal pool tadpole shrimp eggs collected from dry pond sediments at the end of summer hatched in 17 days (Ahl 1991:137). In a study using large plastic pools to simulate natural vernal pools, Helm (1998:133) found that vernal pool tadpole shrimp reached maturity in an average of 38 days following hatching and reproduced an average of 54 days after hatching (Helm 1998:133). Differences in water temperature, which strongly effects the growth rates of aquatic invertebrates, may cause variation in rates of growth and maturation (U.S. Fish and Wildlife Service 2005a:II-206). Vernal pool tadpole shrimp can produce additional eggs during the wet season that hatch without going through a dormant period (Ahl 1991:137).

While vernal pool tadpole shrimp is adapted to seasonal habitats, it has a relatively long lifespan compared to other large branchiopods (U.S. Fish and Wildlife Service 2005a:II-206). In Helm's study (1998:133), vernal pool tadpole shrimp lived an average of 143 days. The long lifespan of vernal pool tadpole shrimp is attributed to its ability to tolerate drying pool conditions and warm water (Helm 1998:135).

Occurrence in and Near the Study Area

There are no recorded occurrences of vernal pool tadpole shrimp in the study area (California Department of Fish and Wildlife 2021a). There are several known occurrences of vernal pool tadpole shrimp at the Sacramento National Wildlife Refuge, approximately 1.25–3 miles from the study area (California Department of Fish and Wildlife 2021a). Potentially suitable habitat for this species in the study area consists of the seasonal wetland and ditch land cover types when adjacent to or surrounded by annual grassland.

10.2.3.4. Valley Elderberry Longhorn Beetle

Status and Distribution

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) is federally listed as threatened. The current range of valley elderberry longhorn beetle consists of the Central Valley from approximately Shasta County south to to Fresno County. It includes the valley floor and lower foothills, with most beetle observations recorded at elevations below 500 feet (U.S. Fish and Wildlife Service 2017a).

Habitat Requirements and Biology

Valley elderberry longhorn beetle is found only in association with its host plant, elderberry (*Sambucus* spp.), which is commonly present in riparian forests and adjacent grasslands in the Central Valley (Barr 1991:4–5). Elderberry shrubs can also be present in non-riparian valley oak (*Quercus lobata*) and blue oak (*Quercus douglasii*) woodland habitats (U.S. Fish and Wildlife Service 2017a:5). Adult valley elderberry longhorn beetles feed on elderberry foliage and are present from March through early June, during which time the adults mate and lay eggs (U.S. Fish and Wildlife Service 2006a:5). Females lay their eggs in bark crevices or at the junction of stem and trunk or leaf petiole and stem (Barr 1991:4). After hatching, the larva burrows into the stem where it develops for 1–2 years and feeds on the pith in the center of the stem (Talley 2007:1480). Before pupation, the larva creates an exit hole, plugs the hole with wood shavings, and returns to the pith to pupate.

After transforming into an adult, valley elderberry longhorn beetle emerges through the previously created exit hole (U.S. Fish and Wildlife Service 2017:4). Exit holes are 0.3–0.4 inch wide (Barr 1991:5). Adult emergence, mating, and egg laying takes place in the spring and summer (March to July) (U.S. Fish and Wildlife Service 2017a:4). Adults feed on elderberry leaves and flowers (Talley 2007:1480). Valley elderberry longhorn beetle abundance is associated with higher levels of nitrogen available in the pith of stressed elderberries (Talley 2007:1480).

Occurrence in and Near the Study Area

There are numerous records for occurrences of valley elderberry longhorn beetle along the Sacramento River in the operations study area (California Department of Fish and Wildlife 2021a). Potentially suitable habitat for this species in the study area consists of upland riparian, scrub-shrub wetland, forested wetland, blue oak woodland, oak savanna, annual grassland, and ruderal land cover types.

10.2.3.5. California Red-legged Frog

Status and Distribution

California red-legged frog (*Rana draytonii*) is federally listed as threatened. The historical range of California red-legged frog extended along the coast from the vicinity of Mendocino in Mendocino County, California, and inland from the vicinity of Redding, California, southward to northwestern Baja California, Mexico (Storer 1925:235–236; Jennings and Hayes 1985:95). The species is known from isolated locations in the Sierra Nevada and the North Coast and northern Transverse Ranges. It is locally abundant in portions of the San Francisco Bay area and along the Central Coast and is still present in Baja California, Mexico (69 FR 19622). California red-legged frog is believed to be extirpated from the floor of the Central Valley (U.S. Fish and Wildlife Service 2002:5). California red-legged frogs have been found at elevations that range from sea level to about 5,000 feet. Nearly all sightings have occurred below 3,500 feet (U.S. Fish and Wildlife Service 2002:1).

Habitat Requirements and Biology

California red-legged frog uses a variety of habitat types that include various aquatic systems, as well as riparian and upland habitats (U. S. Fish and Wildlife Service 2002:12). However, the frogs may complete their entire life cycle in a pond or other aquatic site that is suitable for all life stages (66 FR 14626). California red-legged frogs inhabit marshes, streams, lakes, ponds, and other, usually permanent, sources of water that have dense riparian vegetation (Stebbins 2003:225). Habitat generally consists of still or slow-moving water that is at least 2.5 feet deep and adjacent to shrubby riparian vegetation (willows [*Salix* spp.]) or tules [*Scirpus* sp.] and cattails [*Typha* sp.]) (Jennings and Hayes 1994:64). Although California red-legged frog can inhabit either intermittent or permanent streams or ponds, populations probably cannot be maintained in streams in which all surface water disappears (Jennings and Hayes 1994:64–65).

California red-legged frogs are highly aquatic and spend most of their lives in the riparian zone (Brode and Bury 1984:32). Adults may take refuge during dry periods in rodent holes or leaf litter in riparian habitats (U.S. Fish and Wildlife Service 2002:14). Adult California red-legged frogs have been observed using large cracks in the bottoms of dried ponds as refugia (Alvarez 2004:162). Although California red-legged frogs typically remain near streams or ponds, marked and radio-tagged frogs have been observed to move more than 2 miles through upland habitat. These movements are frequently made during wet weather and at night (U.S. Fish and Wildlife Service 2002:12–13.)

Aestivation habitat consists of riparian vegetation and landscape features within 300 feet of riparian vegetation that provide cover and moisture during the dry season including boulders, rocks, organic debris (e.g., downed trees or logs), industrial debris, and agricultural features (e.g., drains, watering troughs, spring boxes, abandoned sheds, haystacks) (61 FR 25814).

California red-legged frogs breed from November through April and typically lay their eggs in clusters around aquatic vegetation (U.S. Fish and Wildlife Service 2002:16). Larvae typically undergo metamorphosis from July to September, 3.5 to 7 months after hatching (66 FR 14626),

but larvae have been observed to take more than a year to complete metamorphosis in four counties on the Central Coast of California (Fellers et al. 2001:156).

Occurrence in and Near the Study Area

There are no recorded California red-legged frog occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2021a). The closest reported occurrence is approximately 34 miles from the study area in Butte County (California Department of Fish and Wildlife 2021d). California red-legged frog was not found in the Sites Reservoir portion of the survey area during focused surveys for the species in 1997–1998 (Brown and Yip 2000:20). California red-legged frog is considered extirpated from the floor of the Central Valley (U.S. Fish and Wildlife Service 2002:5), which constitutes the portion of the study area generally east of Funks Reservoir. Potentially suitable aquatic habitat for this species in the study area consists of freshwater marsh, perennial stream, intermittent stream, pond, and reservoir land cover types. Potentially suitable upland habitat in the study area consists of annual grassland, blue oak woodland, foothill pine, oak savanna, ruderal, forested wetland, ephemeral stream, scrub-shrub wetland, seasonal wetland, and upland riparian land cover types within 300 feet of aquatic habitat. Potentially suitable upland habitat land cover types within 1 mile of potentially suitable aquatic habitat land cover types in the study area are considered dispersal habitat for California red-legged frog.

10.2.3.6. Giant Gartersnake

Status and Distribution

Giant gartersnake is federally listed as threatened and state listed as threatened. Giant gartersnake is endemic to the Sacramento and San Joaquin Valleys, where it is found in lowland areas (U.S. Fish and Wildlife Service 2015b:I-8). Historically, this species was found throughout the Central Valley from Butte County in the north to Kern County in the south. Giant gartersnake is presently known to occur only in nine discrete populations in Butte, Colusa, Contra Costa, Fresno, Glenn, Kern, Kings, Madera, Merced, Placer, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, Tulare, Yolo, and Yuba Counties (U.S. Fish and Wildlife Service 2015b:9, 11–12).

Habitat Requirements and Biology

Giant gartersnake inhabits marshes, ponds, sloughs, small lakes, low-gradient streams and other waterways, and agricultural wetlands, including irrigation and drainage canals, rice fields, and the adjacent uplands (U.S. Fish and Wildlife Service 2006b:3).

Suitable giant gartersnake aquatic habitat consists of slow-moving or static water that is present from March through November with a mud substrate and the presence of prey (amphibians or fish) (U.S. Fish and Wildlife Service 2017b:I-3). Emergent and bankside vegetation that provides cover from predators and for thermoregulation are also required. Other components of suitable aquatic habitat are basking sites with supportive vegetation (such as folded tule [*Schoenoplectus* spp.] clumps) adjacent to escape cover, upland refugia in locations that are not subject to

recurrent flooding, and the absence of a continuous riparian canopy and large predatory fish, (U.S. Fish and Wildlife Service 2017b:I-3).

Characteristics of suitable upland habitat are available bankside vegetation, such as cattail or tule; shelter that is more permanent in nature, such as bankside cracks and crevices, holes, or small mammal burrows; and banksides that are not subjected to overgrazing (U.S. Fish and Wildlife Service 2017b:I-3). Riparian woodland is generally considered unsuitable habitat because of the lack of basking sites, presence of excessive shade, and lack of prey (U.S. Fish and Wildlife Service 1999:22).

Small mammal burrows and other areas of cover above the flooding zone, such as riprap, are used for overwintering (generally October 1 through April 1). Overwintering snakes have been documented in burrows as far as 656 to 820 feet from the edge of summer aquatic habitat (U.S. Fish and Wildlife Service 2017b:I-3, I-5, I-6). The breeding season extends from March through May. Females give birth to live young from summer to early fall. Giant gartersnake feeds primarily on small fish and amphibians (U.S. Fish and Wildlife Service 2017b:I-5, I-6).

Occurrence in and Near the Study Area

There are four records for occurrences of giant gartersnake in the study area and numerous occurrences of giant gartersnake recorded within 5 miles of the study area, including at Sacramento National Wildlife Refuge, in other areas east of the inundation area, and at the east end of the Dunnigan Pipeline (California Department of Fish and Wildlife 2021a). Potentially suitable aquatic habitat for giant gartersnake in the study area consists of canal, ditch, freshwater marsh, managed wetland, pond, and rice land cover types. Suitable giant gartersnake upland habitat in the study area consists of annual grassland, disturbed, and ruderal land cover types within 200 feet of suitable aquatic habitat. Aquatic and upland habitats for giant gartersnake in the study area are east of the GCID Main Canal except for upland habitat within 200 feet west of GCID Main Canal; and east and west of the GCID Main Canal south of Stone Corral Creek.

10.2.3.7. Golden Eagle

Status and Distribution

Golden eagle is fully protected under the California Fish and Game Code and protected by the Bald and Golden Eagle Protection Act (BGEPA). Golden eagle is a year-round resident throughout much of California. The species does not breed in the center of the Central Valley but breeds in much of the rest of the state (Zeiner et al. 1990a:142–143).

Habitat Requirements and Biology

Golden eagle inhabits nearly all terrestrial habitats of the western United States, except densely forested, densely populated, and agricultural areas (Katzner et al. 2020). Secluded, protected cliffs with overhanging ledges are usually preferred for nesting but large trees are also used for nesting and cover (Driscoll 2010:1, Hunt et al. 1999:4). Preferred territory sites include those that have a favorable nest site, a dependable food supply (medium to large mammals and birds), and broad expanses of open country for foraging. Hilly or mountainous country where takeoff

and soaring are supported by updrafts is generally preferred to flat habitats (Johnsgard 1990:262). In the interior central Coast Ranges of California, golden eagles favor open grasslands and oak savanna, with lesser numbers in oak woodland and open shrublands. In the Diablo Range of California, all except a few pairs nest in trees in oak woodland and oak savanna habitats due to a lack of suitable rock outcrops or cliffs. Nest trees include several oak species (*Quercus* spp.), foothill pine (*Pinus sabiniana*), Coulter pine (*Pinus coulteri*), California bay laurel (*Umbellularia californica*), eucalyptus *(Eucalyptus* spp.), and western sycamore (*Platanus racemosa*). Eagles will also nest on electrical transmission towers traversing grasslands (Hunt et al. 1999:13).

Grasslands, deserts, savannas, and early successional stages of forest and shrub habitats provide open foraging terrain for golden eagles (Zeiner et al. 1990a:142). Golden eagle preys on a variety of animal species, with mammals making up 80–90% of its diet (Driscoll 2010:2). The golden eagle nesting season is generally late March through the end of August. In the Diablo Range of California, courtship behaviors have been observed in December and January (Katzner et al. 2020).

Occurrence in and Near the Study Area

Although there are no recorded occurrences of golden eagle in the study area or within 5 miles of the study area (California Department of Fish and Wildlife 2021a), there are numerous observations of individuals in the study area that are recorded in eBird (Cornell Lab of Ornithology 2021). Potentially suitable golden eagle nesting habitat in the study area consists of blue oak woodland, foothill pine, and oak savanna land cover types. Potentially suitable foraging habitat for golden eagle in the study area consists of annual grassland, oak savanna, mixed chaparral, ornamental woodland, and ruderal land cover types.

10.2.3.8. Bald Eagle

Status and Distribution

Bald eagle is state listed as endangered and is protected under the BGEPA. Bald eagle is a permanent resident and uncommon winter migrant in California (California Department of Fish and Game 1999a).

Habitat Requirements and Biology

Bald eagle breeds at coastal areas, rivers, lakes, and reservoirs with forested shorelines or cliffs in northern California. Wintering bald eagles are associated with aquatic areas containing some open water for foraging. Bald eagle nests in trees in mature and old growth forests that have some habitat edge and are somewhat close (within 1.25 miles) to water with suitable foraging opportunities. The average distance of bald eagle nests to human is 0.3 mile for most populations, which indicates a preference for nesting away from human developments. (Buehler 2020). Bald eagle will occasionally nest in riparian habitats, where nests are often in black cottonwoods (*Populus trichocarpa*) (Anthony et al. 1982:333). In California, ponderosa pine (*Pinus ponderosa*) and sugar pine (*Pinus lambertiana*) are the most frequently used tree species for nesting (Lehman 1979:13, Anthony et al. 1982:333). Where no large conifers are present,

bald eagle will nest in deciduous trees such as oaks and cottonwoods (*Populus* spp.). Bald eagles build their nests in the upper canopy, generally selecting the largest trees in the area (Buehler 2020).The breeding season is February through July (Zeiner et al. 1990a:122).

Roost sites, like nest sites, are associated with aquatic foraging areas, but roost sites are farther from water than nest sites (Buehler 2020). Bald eagle is an opportunistic forager that takes live prey and scavenges carrion. Bald eagles hunt for live fish in shallow water but more frequently scavenge dead or dying fish. Bald eagle also eats other aquatic and terrestrial animals including waterfowl, muskrats (*Ondatra zibethicus*), raccoons, and small mammals (Buehler 2020; Jackman et al. 1999:87, 90–92; California Department of Fish and Game 1999a).

Occurrence in and Near the Study Area

Although there are no recorded occurrences of bald eagle in the study area (California Department of Fish and Wildlife 2021a), there is one known bald eagle occurrence at Sacramento National Wildlife Refuge, approximately 1.5 miles from the study area (California Department of Fish and Wildlife 2021a). Several bald eagles were observed by an ICF biologist at Funks Reservoir in January 2021 during focused bird surveys for geotechnical boring investigation locations. Potentially suitable habitat for this species in the study area consists of blue oak woodland, foothill hill pine, forested wetland, perennial stream, reservoir, and upland riparian land cover types.

10.2.3.9. Swainson's Hawk

Status and Distribution

Swainson’s hawk is state listed as threatened. The breeding range for Swainson’s hawk in California consists of the extreme northeast portion of the state, the Sacramento and San Joaquin Valleys, valleys of the Sierra Nevada in Inyo and Mono Counties, and occasionally elsewhere in the state (Bechard et al. 2020). Swainson’s hawks primarily winter in South America but some individuals winter in the Sacramento–San Joaquin River Delta (Bechard et al. 2020).

Habitat Requirements and Biology

Swainson’s hawks arrive in the Central Valley in March or April to establish nesting territories and breed (California Department of Fish and Wildlife 2016:5). They usually nest in large, mature trees. Most nest sites (87%) in the Central Valley are found in riparian habitats (Estep 1989:35), primarily because trees are more available there. Swainson’s hawk also nests in mature roadside trees and in isolated trees in agricultural fields or pastures. The breeding season is from March through August (Estep 1989:12, 35). Nest sites are generally adjacent to, or within flying distance of, suitable foraging habitat and near large tracts of agricultural lands (California Department of Fish and Wildlife 2016:8).

Swainson’s hawk forages in grasslands, grazed pastures, alfalfa and other hay crops, and certain grain and row croplands. Vineyards, orchards, rice, and cotton crops are generally unsuitable for foraging because of the density of the vegetation (California Department of Fish and Game 1992:41). Important land cover types for foraging are alfalfa and other irrigated hay crops, grain

and row crops, fallow fields, dryland pasture, grassy ruderal lots, and annual grasslands (Swolgaard et al. 2008:192, 194; California Department of Fish and Wildlife 2016:7). In California, voles make up a large portion of Swainson's hawk's diet, but it will also eat ground squirrels, pocket gophers, and deer mice (*Peromyscus* spp.) (Bechard et al. 2020).

Occurrence in and Near the Study Area

There are numerous records for Swainson's hawk nest sites along the Sacramento River and other locations in the study area. Potentially suitable nesting habitat in the study area consists of blue oak woodland, forested wetland, oak savanna, ornamental woodland, and upland riparian land cover types. Foraging habitat for Swainson's hawk in the study area consists of annual grassland, hayfield, managed wetland, oak savanna, row crops, ruderal, and seasonal wetland land cover types.

10.2.3.10. White-tailed Kite

Status and Distribution

White-tailed kite is fully protected under the California Fish and Game Code. In California, white-tailed kite occurs in coastal and valley lowlands and is rarely found away from agricultural areas (Zeiner et al. 1990a:120).

Habitat Requirements and Biology

White-tailed kite nests in trees or shrubs in open grassland, agricultural, wetland, oak woodland, and savanna habitats (Dunk 2020). Habitat elements that influence nest site selection and nesting distribution include habitat structure (usually trees with a dense canopy) and prey abundance and availability (primarily the association with California vole), while the association with specific vegetation types (e.g., riparian, oak woodland, etc.) appears less important (Erichsen et al. 1996:165, 173; Dunk 2020). White-tailed kite nests have been documented in a variety of tree species, including oaks, Fremont's cottonwood (*Populus fremontii*), willow, eucalyptus, box elder (*Acer negundo*), coast redwood (*Sequoia sempervirens*), ornamental trees including olive (*Olea* sp.) and pine (*Pinus* sp.) trees, and in shrubs less than 10 feet tall (e.g., *Atriplex* and *Baccharis*) (Dixon et al. 1957:159; Erichsen et al. 1996:172; Dunk 2020). Nest trees appear to be selected based on structure and security, and thus typically have a dense canopy or are in a dense group of trees or large stands (more than 250 acres). White-tailed kites also nest in single isolated trees and communally roost in small stands of trees (Dunk 2020). The breeding season lasts from February through October and peaks between May and August (Zeiner et al. 1990a:120).

White-tailed kites forage in undisturbed, open grassland, meadows, farmland, and emergent wetlands (Zeiner et al. 1990a:120). The foraging success of white-tailed kite is directly proportional to the abundance and composition of prey species (Erichsen et al. 1996:173), with rodents being the main prey type (Dunk 2020; Mendelsohn and Jaksic 1989:8). Preferred foraging habitats are ungrazed grasslands, open woodlands, low shrubs, wetlands dominated by grasses, and fence rows and irrigation ditches with residual vegetation adjacent to grazed lands (Mendelsohn and Jaksic 1989:2, 8; Dunk 2020). In cultivated areas, alfalfa and sugar beet fields

are preferred, as well as rice stubble fields in the spring (Erichsen et al. 1994:46; Erichsen et al. 1996:170).

Occurrence in and Near the Study Area

There are no recorded occurrences of white-tailed kite in the study area (California Department of Fish and Wildlife 2021a). There is one record for a white-tailed kite nest site approximately 2.5 miles south of the RBPP and one record for a nest site approximately 3 miles east of the southern portion of the inundation area (California Department of Fish and Wildlife 2021a). Potentially suitable nesting habitat in the study area consists of blue oak woodland, forested wetland, oak savanna, ornamental woodland, and upland riparian land cover types. Foraging habitat for white-tailed kite in the study area consists of annual grassland, hayfield, managed wetland, oak savanna, row crops, ruderal, and seasonal wetland land cover types.

10.2.3.11. Western Yellow-billed Cuckoo

Status and Distribution

The western distinct population segment of the yellow-billed cuckoo is federally listed as threatened (79 FR 59992) and state listed as endangered (California Department of Fish and Wildlife 2021b). The breeding range of western yellow-billed cuckoo in California consists of isolated locations along the South Fork Kern River, lower Colorado River, and Sacramento River (Hughes 2015).

Habitat Requirements and Biology

Breeding western yellow-billed cuckoos are riparian obligates and nest almost exclusively in riparian woodland with native broadleaf trees and shrubs (Halterman et al. 2015:3). Suitable habitat has a tree or large-shrub component with a variable overstory canopy and an understory component (U.S. Fish and Wildlife Service 2019:5, 6). The overstory of the riparian habitat typically includes cottonwood and willow trees (U.S. Fish and Wildlife Service 2019:6). Nest sites are often in dense foliage, and nests are primarily in willow, Fremont's cottonwood, and mesquite (*Prosopis* sp.). Along the Sacramento River, nests have rarely been found in prune (*Prunus* sp.), English walnut (*Juglans regia*), and almond (*Prunus dulcis*) orchards (Laymon 1998:4). Cottonwoods are used extensively for foraging and are an important component of foraging habitat (78 FR 61634).

Western yellow-billed cuckoo requires large blocks of riparian habitat for breeding (78 FR 61633). Patch size was found to be the most important habitat variable to predict presence of western yellow-billed cuckoo on the Sacramento River (Girvetz and Greco 2009). Large patch sizes (50 to 100 acres, with a minimum width of 328 feet) are typically required for cuckoo occupancy (Riparian Habitat Joint Venture 2004).

Western populations of yellow-billed cuckoos form pairs in mid-June or later and breed from June to August, with a peak in mid-July to early August (Hughes 2015). Breeding is restricted to the middle of summer, presumably because of a seasonal peak in large insect abundance (Rosenberg et al. 1982). To accommodate this, development of young is very rapid with a

breeding cycle of 17 days from egg-laying to fledging of young (Hughes 2015). Western populations continue nesting through August, and up to three broods can be raised in a season if the prey base is sufficient. The birds begin their southbound migration in mid-August, and most have left the breeding grounds by mid-September (78 FR 61632).

Little is known about western yellow-billed cuckoo migratory habitat. Yellow-billed cuckoos may be found in a variety of vegetation types during migration, which suggests that the habitat needs of the cuckoo during migration are not as restricted as their habitat needs during the breeding season. Yellow-billed cuckoo may also be found in smaller riparian patches during migration than those in which it typically nests (78 FR 61634).

Occurrence in and Near the Study Area

There are numerous records for occurrences of western yellow-billed cuckoo along the Sacramento River in the operations study area (California Department of Fish and Wildlife 2021a). Potentially suitable western yellow-billed cuckoo habitat in the operations study area consists of forested wetland, scrub-shrub wetland, and upland riparian land cover types that are a minimum of 37 acres in size and have a minimum patch width of 328 feet and a maximum canopy gap width of 328 feet.

10.2.3.12. Bank Swallow

Status and Distribution

Bank swallow (*Riparia riparia*) is state listed as a threatened (California Department of Fish and Wildlife 2021b). The geographic range for bank swallow in California includes breeding in portions of the northern and central regions of the state where appropriate habitat exists. There are scattered colonies throughout northern California, but an estimated 70% to 90% of the breeding population is along the Sacramento River and its tributaries. This species spends winters in Central and South America (Bank Swallow Technical Advisory Committee 2013:9–10) and breeds in California between approximately March and September (California Department of Fish and Game 1999b).

Habitat Requirements and Biology

Riparian, lake, and coastal areas with vertical banks, bluffs, and cliffs with fine-textured or sandy soils provide suitable habitat for bank swallow (California Department of Fish and Game 1999b). Bank swallows typically establish colonies along eroded, vertical banks in river systems with friable alluvial soils. Nesting colonies are infrequently found in artificial sites, including sand quarries and road cuts (Bank Swallow Technical Advisory Committee 2013:12–13). Nesting sites are almost always near water (California Department of Fish and Game 1999b). In addition, riparian overbank vegetation appears to be an important habitat feature for bank swallow nesting, foraging, or both on the Sacramento River; a 10-year survey indicated that colonies were more strongly associated with native herbaceous/scrub and riparian forest habitat types, than with orchards (Garcia 2009:53, 55; Bank Swallow Technical Advisory Committee 2013:13). Nesting site selection is also based on attributes such as soil moisture, soil texture, orientation of the bank

face, verticality of the bank face, and proximity to foraging areas (California Department of Fish and Game 1995:11).

Foraging habitat for bank swallow includes wetlands, open water, grasslands, riparian woodland, orchards, agricultural fields, shrub lands, and upland woodlands (Bank Swallow Technical Advisory Committee 2013:14, California Department of Fish and Game 1999b). This species typically forages within approximately 650 feet of nest sites but may forage up to 6 miles away (Garrison 1998:4). Bank swallows typically forage in flight on a wide variety of aerial and terrestrial soft-bodied insects including flies, bees, and beetles (Bank Swallow Technical Advisory Committee 2013:14, California Department of Fish and Game 1999b).

Bank swallow nests in colonies ranging in size from three to over 3,000. Females typically lay three to five eggs, and are thought to have one brood per season, but may have two. Peak egg-laying is between mid-April and mid-May, and most juveniles fledge by mid-July (Bank Swallow Technical Advisory Committee 2013:11–12).

Occurrence in and Near the Study Area

There are numerous CNDDB records for occurrences of bank swallow along the Sacramento River in the operations study area. The occurrences that are closest to construction areas are 0.2 mile from the RBPP and 0.4 mile from the GCID head gate structure, both along the Sacramento River (California Department of Fish and Wildlife 2021a). Potentially suitable bank swallow nesting habitat in the study area consists of portions of the Sacramento River with eroded, vertical banks. Potentially suitable bank swallow foraging habitat in the study area consists of annual grassland, blue oak woodland, barren, chamise chaparral, ephemeral stream, forested wetland, foothill pine, freshwater marsh, intermittent stream, mixed chaparral, oak savanna, perennial stream, pond, reservoir, scrub-shrub wetland, seasonal wetland, upland riparian, canal, disturbed, ditch, hayfield, managed wetland, orchard, ornamental woodland, reservoir, rice, row crops, ruderal, and vineyard land cover types.

10.2.3.13. Tricolored Blackbird

Status and Distribution

Tricolored blackbird is state listed as threatened. Tricolored blackbird is a highly colonial species that is largely endemic to California. The historical tricolored blackbird breeding range in California included the Sacramento and San Joaquin Valleys, the foothills of the Sierra Nevada south to Kern County, the coastal slope from Sonoma County south to the Mexican border, and, sporadically, the Modoc Plateau. However, historical surveys did not include large areas of the species' currently known breeding range (Shuford and Gardali 2008:438). The species' overall range has not changed much since the mid-1930s (Beedy et al. 2020), though more recent surveys have documented additional local populations at the periphery of the range (e.g., as far north along the Pacific Coast as Humboldt County, and in the western Mojave desert), and new colony sites within the overall historical range (Shuford and Gardali 2008:439).

Habitat Requirements and Biology

Suitable tricolored blackbird breeding colony sites have open, accessible water; a protected nesting substrate, including either flooded, thorny, or spiny vegetation; and a suitable foraging space providing adequate insect prey within a few miles of the nesting colony. Tricolored blackbird breeding colonies occur in freshwater marshes dominated by tules and cattails, in Himalayan blackberry (*Rubus armeniacus*), and in silage and grain fields (Beedy and Hamilton 1997:3–4). The breeding season is from early March to early August (Beedy et al. 2020).

Tricolored blackbird foraging habitats in all seasons include annual grasslands, dry seasonal pools, agricultural fields (such as large tracts of alfalfa with continuous mowing schedules, and recently tilled fields), cattle feedlots, and dairies. Tricolored blackbirds also forage occasionally in riparian scrub habitats and along marsh borders. Weed-free row crops and intensively managed vineyards and orchards do not serve as regular foraging sites. Most tricolored blackbirds forage within 3 miles of their colony sites but commute distances of up to 8 miles have been reported (Beedy and Hamilton 1997:5).

Occurrence in and Near the Study Area

There are two records for presumably extant tricolored blackbird colonies that overlap the study area; one is east of the inundation area and the other is east of the GCID system improvements area. There are numerous records for occurrences of tricolored blackbird colonies within 5 miles of the study area (California Department of Fish and Wildlife 2021a). Potentially suitable tricolored blackbird nesting habitat in the study area consists of freshwater marsh and managed wetland land cover types. Potentially suitable foraging habitat for tricolored blackbird in the study area consists of annual grassland, rice, row crops, and seasonal wetland land cover types within 3 miles of suitable nesting habitat. Ruderal areas are also considered suitable foraging habitat when adjacent to other suitable foraging habitat land cover types.

10.3 Methods of Impact Analysis

The methods for analysis of impacts on wildlife resources are based on professional standards and information cited throughout this section. The key impacts were identified and evaluated based on the environmental characteristics of the study area and the expected magnitude, intensity, and duration of activities related to the construction and operation of the Project.

Direct impacts are those effects that would be caused by the Project and would occur at the same time and place. Filling of the reservoir is considered a direct impact, even though it would take time for the reservoir to be filled completely. Indirect impacts are those effects that are caused by the Project but would occur later in time (e.g., impacts from operations) or be farther from the Project but are reasonably foreseeable (e.g., impacts downstream of the Project). Direct and indirect impacts may be either permanent or temporary. Short-term temporary impacts on wildlife resources would occur when temporarily affected areas would be restored to preconstruction conditions within 1 year. Long-term temporary impacts would occur when impacts on wildlife resources would be temporary but would last more than 1 year. Short-term

temporary impacts are calculated as temporary impacts and long-term temporary impacts were calculated as permanent impacts in the impact analysis. The study area for wildlife resources includes a 300-foot-wide area beyond the permanent and temporary impact areas. For vernal pool branchiopods, the amount of modeled habitat within 250 feet of impact boundaries was estimated for potential impacts such as changes in hydrology that would indirectly but permanently affect modeled habitat. The additional 300-foot area was assessed for potential temporary direct impacts on wildlife resources. For operational impacts only, the study area for wildlife resources also includes the Sacramento River between the RBPP and the Delta (i.e., operations study area).

In general, permanent and temporary impacts on potential habitat for special-status species are overestimated because the entirety of the land cover is considered affected even when specific habitat requirements may be absent (e.g., elderberry shrubs, which are host plants for valley elderberry longhorn beetle, in riparian land cover types).

10.3.1. Construction

Direct permanent impacts on special-status wildlife and their habitats were assessed using the estimated amounts of modeled habitat (as described in Section 10.2.1, *Methods for Assessing Wildlife Resources in the Study Area*) that would be converted by Project construction. Construction impacts include both construction of facilities and filling of Sites Reservoir. Short-term and long-term temporary impacts on habitat for wildlife species were calculated using the estimated acreages of land cover types that would be temporarily disturbed during Project construction based on the amount of time the land cover would be disturbed (i.e., less than or more than 1 year of disturbance). One of the assumptions of the impact analysis was that the conditions on parcels of land surrounding the reservoir would be maintained similar to existing conditions (e.g., as grazing lands).

Impacts on special-status wildlife habitats were calculated using GIS software. GIS data of the Project footprint and associated temporary impact areas were overlaid on the modeled species habitat (and in a few cases, land cover mapping data) to quantify the permanent and temporary impacts associated with the construction of the Project facilities. Impacts on individuals of special-status wildlife species were assumed if modeled habitat was affected. Special-status wildlife species identified as having moderate to high potential to occur in the study area (Table 10A-1 in Appendix 10A) were included in the impact analysis. The special-status wildlife species with low potential were not included in the impact analysis because they are not expected to occur in the study area or be affected by the Project.

The following assumptions and alternative details regarding specific Project components were applied to the impact analysis:

- Installation of the two additional TC Canal diversion pumps at the RBPP would not affect any modeled habitat for special-status wildlife because construction would occur in the existing facility footprint. In addition, work would be short term. These activities would likely be conducted during winter because dewatering would be required and because it

would be outside of the nesting bird season. No impacts are anticipated and this area is not considered further in this analysis.

- Impacts from the north-south transmission line and the east-west transmission line would be primarily long-term temporary for installation of new high-voltage electrical transmission lines to power the regulating reservoirs. Only one of the two alignments described in Chapter 2, *Project Description and Alternatives*, would be constructed. Small areas for new transmission line towers would be required in the alignment, but specific locations are currently unknown. The maximum permanent impact from the towers would total less than 0.01 acre. The entire area of the transmission line alignments is included in the long-term temporary impact acreages; therefore, this impact is overestimated.
- Quarries located outside the inundation area would be regraded and allowed to revegetate at the bottoms but would not return to pre-Project conditions.
- Offsite borrow areas would be in existing active commercial facilities and are not part of the impact analysis for wildlife resources.
- The reservoir would replace existing land cover types with open water and Alternative 1 or 3 would permanently flood a larger area than Alternative 2.
- The footprints for the Peninsula Hills, Stone Corral Creek, and day-use boat ramp/parking recreation areas represent the total area that could be used for recreation activities, but only a portion of each footprint would be permanently affected as a result of construction of campsites, parking areas, picnic areas, hiking trails, potable water sources, utility connections, kiosks (at Peninsula Hills and Stone Corral Creek Recreation Areas), and toilets. Therefore, permanent impacts from these facilities are overestimated.
- New road construction would result in the permanent loss of existing land cover types in the entire construction disturbance area, and improvements to existing roads would affect only the area to the edges of the rights-of-way. The exact locations of the realigned Huffmaster Road, new Comm Road South, and new South Road are not yet finalized. Corridors were used to identify the areas in which potential direct and indirect impacts would occur. For example, for South Road, a 400-foot-wide conceptual road alignment plus a 300-foot-wide buffer was identified to allow for design flexibility. Because the final realigned South Road location is unknown, the entire 700-foot-wide corridor was assumed to be permanently affected for the purpose of the impact analysis. Within the corridors, the actual permanent impact area would be only the footprint of roads and shoulders with additional temporarily affected areas for construction staging and equipment movement. Therefore, permanent impacts from these facilities are overestimated.

The following BMPs, which are described in Appendix 2D, *Best Management Practices*, are incorporated into the analysis of potential construction impacts on wildlife resources.

- Salvage, Stockpile, and Replace Topsoil and Prepare a Topsoil Storage and Handling Plan – requires evaluation of topsoil for salvaging suitability and storage and handling plans when topsoil cannot be used without stockpiling.
- Develop and Implement Stormwater Pollution Prevention Plan(s) (SWPPP) and Gain Coverage under Stormwater Construction General Permit (Storm Water and Non-Storm Water) – requires development and use of erosion control measures, sediment control measures, construction materials management measures, waste management measures, non-stormwater control measures, and post-construction stormwater management measures.
- Fugitive Dust Control Plans – requires various measures to minimize dust emissions.
- Visual/Aesthetic Design, Construction, and Operation Practices – requires all construction lighting to be directional to minimize glare impacts to wildlife; requires permanent outdoor lighting to be limited to safety and security requirements, to be shielded to minimize off-site light spill and glare, and to be screened and directed away from adjacent uses to the highest degree possible.
- Develop and Implement Spill Prevention and Hazardous Materials Management/Accidental Spill Prevention, Containment, and Countermeasure Plans (SPCCPs) and Response Measures – requires site-specific plans with measures to minimize effects from spills of hazardous or petroleum substances during construction and operation/maintenance.
- Worker Environmental Awareness Program (WEAP) – requires training of all construction crews and contractors on protection and avoidance of biological, cultural, archaeological, paleontological, and other sensitive resources.
- Construction Best Management Practices and Monitoring for Fish, Wildlife, and Plant Species Habitats, and Natural Communities – requires a construction monitoring plan for sensitive biological resources and in-water construction activities, use of exclusion fencing around sensitive biological resources, limiting vehicle speeds to 15–20 miles per hour on unpaved roads, and measures for construction personnel to protect wildlife.
- Nighttime Work (Alternative 2 Discharge Location on Sacramento River) – requires work lights to be shaded to minimize illumination of water in order to minimize disturbance to wildlife species.

The following BMPs would be implemented for Alternatives 1, 2, and 3 to reduce direct and indirect impacts on special-status species and are incorporated into the impact analysis.

- Training construction staff about avoiding impacts on sensitive biological resources.
- Preparing a biological monitoring plan covering all required avoidance and minimization measures.
- Construction monitoring by qualified biologists.
- Protecting sensitive biological resources with staking and flagging or fencing.

- Requiring trash to be removed from work sites daily.
- Restricting vehicle speeds to reduce the potential for vehicle strikes.
- Prohibiting firearms and pets in construction areas.
- Covering all trenches and holes at the end of each day and inspecting prior to the start of work each day to prevent wildlife entrapment.
- Prohibiting the use of netting for erosion control to prevent special-status wildlife from being entangled in the net.
- Requiring lighting during construction to be directional to minimize glare and potential nighttime impacts on special-status wildlife that are active at night.

10.3.2. Operation

Because operation of the Project would not involve additional earth-moving or substantial disturbance of new areas, acreage impacts from operation were not assessed. The operation phase would include primarily changes in water diversions to Sites Reservoir, energy generation and use, and routine tasks to maintain the facilities after construction according to operations and maintenance plans that would be developed. Maintenance would include vegetation control and grazing around all facilities, recreation areas, and a 100-foot buffer around the facilities. These activities would affect undeveloped land where special-status wildlife or their habitats could occur. Because public use of recreation areas could affect areas that support special-status wildlife or their habitats, impacts that could result during operation of recreation areas were considered.

The completion and implementation of a Land Management Plan, which is described in Appendix 2D, *Best Management Practices*, are incorporated into the analysis of potential operation impacts on wildlife resources. This plan would address management and maintenance activities on all non-recreation land resources held in fee or easement (including the Project buffer) by the Authority, including vegetation maintenance, invasive aquatic and plant control, and rodent control. The plan would include general measures and practices when working in or near habitat for special-status wildlife and specify when pre-activity surveys or monitoring would be required prior to or during maintenance activities.

10.3.3. Thresholds of Significance

An impact on wildlife resources would be considered significant if the Project would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any wildlife species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or U.S. Fish and Wildlife Service (USFWS).
- Interfere substantially with the movement of a native resident or migratory wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.

- Conflict with any local policies or ordinances protecting wildlife resources.
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

10.4 Impact Analysis and Mitigation Measures

Impact WILD-1: Substantial adverse effect (i.e., loss or removal), either directly or through habitat modifications, on wildlife species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service (*the following impact analysis is subdivided into lettered components, and special-status species are grouped together where appropriate*)

Summary tables showing permanent and temporary impacts on modeled habitat for special-status species by alternative are included for each group of special-status wildlife discussed below. Appendix 10C, *Wildlife Impact Tables,* has detailed tables showing permanent and temporary impacts on modeled habitat for special-status species by Project component.

No Project

Under the No Project Alternative, no new Project facilities would be constructed or operated. As described in Section 10.2, *Environmental Setting*, special-status wildlife species and their habitats are known or have the potential to occur in the Project area. Because there would be no construction or operation of new Project facilities under the No Project Alternative, there would be no temporary or permanent impacts on special-status wildlife or their habitats.

Significance Determination

The No Project Alternative would not result in a substantial adverse effect, either directly or through habitat modifications, on special-status wildlife species. There would be no impact.

Alternatives 1, 2, and 3

The analyses of Project construction and operation impacts for special-status wildlife species are presented for individual species or groups of species, where appropriate. The analyses incorporate BMPs that would be implemented to reduce potential impacts on special-status wildlife species. For example, construction workers would be trained on the importance of avoiding special-status wildlife and plant species, and fencing would be required around sensitive habitats where avoidance during construction is feasible. The BMPs would also restrict off-road driving in construction areas to prevent disturbance in and damage to habitats that would be avoided during construction (e.g., those adjacent to work areas or in activity exclusion zones). While these BMPs would reduce impacts during construction, they would not prevent the

permanent loss of habitat or degradation of habitat, described further below by species, as a result of construction of Alternative 1, 2, or 3.

Aquatic Invertebrates

Impact WILD-1a: Vernal Pool Branchiopods

Direct permanent and temporary impacts and indirect impacts on modeled habitat for Conservancy fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp (i.e., vernal pool branchiopods) from Alternatives 1, 2, and 3 are shown in Table 10-2a.

Table 10-2a. Acreages of Permanent and Temporary Impacts on Modeled Special-Status Vernal Pool Branchiopod Habitat in the Study Area

	Alternatives 1 and 3 Permanent Impacts	Alternatives 1 and 3 Temporary Impacts	Alternatives 1 and 3 Indirect Impacts	Alternative 2 Permanent Impacts	Alternative 2 Temporary Impacts	Alternative 2 Indirect Impacts
Conservancy Shrimp, Vernal Pool Fairy Shrimp, and Vernal Pool Tadpole Shrimp	366	0	120	358	0	123

Alternatives 1 and 3

Modeled habitat for vernal pool branchiopods is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, and recreation areas.

Construction

Construction of Alternative 1 or 3 would result in permanent loss of modeled habitat for vernal pool branchiopods (Table 10-2a). Modeled habitat would also be lost when the reservoir is inundated. Clearing and grubbing, excavation, and other construction activities could result in individuals or cysts being crushed or buried by equipment. Spills or leaks of gasoline, oil, or other contaminants during construction could contaminate suitable habitat and cause illness or mortality of individuals.

Operation

Indirect effects on vernal pool branchiopods could occur during operation as a result of changes in topography, compaction of soils, and increases in surface runoff from the additional

impervious surfaces associated with the new facilities. These changed conditions could modify the existing hydrologic regime of modeled vernal pool branchiopod habitat in or within 250 feet of affected areas (Table 10-2a). Changes in topography could result in additional water entering habitat or could interfere with existing water flow into habitats, thereby increasing or reducing the amount of water entering habitat. Changes to the length of the inundation period of habitat could affect vernal pool branchiopod reproduction.

Indirect effects on vernal pool branchiopods from new or increased contaminants such as gasoline, oil, and herbicides entering habitat from adjacent new or widened roads, or new facilities, could cause illness or mortality of individuals.

Impacts on vernal pool branchiopods from maintenance activities are not expected to occur because maintenance activities would be conducted mostly in previously disturbed areas using existing roadways.

Modeled vernal pool branchiopod is present at the recreation areas, which would be used by visitors on a regular basis. There is potential for visitors to access undeveloped areas and disturb existing habitat (e.g., walk through habitat, increase trash). If vernal pool branchiopods were present in the modeled habitat, they could be crushed by visitors. The entire footprint of the recreation areas was assumed to be affected, and any operation impacts on modeled habitat in these areas would be compensated for through habitat mitigation for permanent effects.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on vernal pool branchiopods from removal of suitable habitat and loss of individuals. Indirect operational effects on vernal pool branchiopods could also result from changes in topography, soil compaction, and increased amounts of impervious surfaces, which could modify the existing hydrologic regime of vernal pool branchiopod habitat. These impacts would be significant because implementation of Alternative 1 or 3 could reduce the local populations of federally listed vernal pool branchiopods through direct mortality and habitat loss. The largest continuing threats to vernal pool branchiopods are habitat loss and modification of habitat from urban development and agricultural conversion (U.S. Fish and Wildlife Service 2007a:16, U.S. Fish and Wildlife Service 2007b:27).

Implementation of Mitigation Measures WILD-1.1, WILD-1.2, and WILD-1.3 would reduce the level of impact to less than significant because surveys would be conducted to determine presence, habitat disturbance would be avoided during the rainy season, the topsoil of vernal pools in permanent impact areas would be removed for use in habitat creation or restoration, and compensation would be provided for impacts on occupied habitat. All modeled habitat would be evaluated, and suitable habitat would be surveyed for the presence of vernal pool branchiopods prior to construction. Direct and indirect impacts on occupied habitat would be mitigated through acquiring and protecting habitat in perpetuity or purchasing mitigation credits in accordance with mitigation ratios and requirements developed during ESA Section 7 consultation with USFWS.

Mitigation Measure WILD-1.1: Assess Habitat Suitability and Survey Suitable Habitat for Vernal Pool Branchiopods

The Authority will employ qualified biologists to assess habitat suitability and conduct surveys for vernal pool branchiopods in the Project area and where modeled habitat is within 250 feet of the Project area and indirect effects may occur. Qualified biologists are defined as those who have a recovery permit from USFWS to conduct surveys for listed vernal pool branchiopods. The surveys will be conducted in accordance with the *Survey Guidelines for the Listed Large Branchiopods*, which recommend surveys at 14-day intervals after initial inundation of habitat until the habitat dries or it has been inundated for a minimum of 90 consecutive days (U.S. Fish and Wildlife Service 2015b). The biologists will submit the results of the surveys in a report to USFWS, per the requirements of the biologists' recovery permits.

Mitigation Measure WILD-1.2: Avoid and Minimize Potential Effects on Vernal Pool Branchiopods and Western Spadefoot

The following steps will be taken to avoid or minimize potential effects on vernal pool branchiopods and western spadefoot.

- Ground disturbance within 250 feet of suitable habitat to be protected will be avoided during the rainy season (approximately October 15 through May 15).
- If a portion of suitable vernal pool branchiopod and western spadefoot habitat will be filled (i.e., permanent impacts), the filling will be conducted when the habitat is completely dry.
- If requested by USFWS, the top 3 to 4 inches of soil of pools occupied by listed or unlisted vernal pool branchiopods that would be destroyed or completely filled will be removed and stored in the Project area until ready for placement in created or restored habitat outside of the Project footprint. The topsoil will be covered with tarps or other appropriate material and orange construction barrier fencing or stakes and flagging will be installed around the covered topsoil. A qualified biologist will be onsite to monitor the removal and covering of the topsoil during periodic monitoring visits to the Project area. The stored topsoil will be spread over the bottom of created or restored pools prior to the start of the winter rainy season.

Mitigation Measure WILD-1.3: Compensate for Impacts on Occupied Vernal Pool Branchiopod Habitat

The Authority will compensate for direct and indirect effects on occupied vernal pool branchiopod habitat through the purchase of mitigation credits at a USFWS-approved conservation bank or through acquiring, creating or restoring, and protecting habitat in perpetuity at a location approved by USFWS. Habitat that is directly or indirectly affected will be mitigated by preserving habitat at a 2:1 ratio (habitat preserved: habitat directly or indirectly affected) and habitat that is directly affected will be mitigated by

creating habitat at a 1:1 ratio (habitat created: habitat directly affected), or as otherwise determined during ESA Section 7 consultation with USFWS. Details of the compensation will be further developed in consultation with USFWS.

NEPA Conclusion

Construction and operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA. With implementation of Mitigation Measures WILD-1.1, WILD-1.2, and WILD-1.3, the effects would be reduced to no adverse effect on vernal pool branchiopods.

Alternative 2

Modeled habitat for vernal pool branchiopods may be present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR West, TRR/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, and recreation areas.

Construction

Construction of Alternatives 2 would result in the permanent loss of modeled habitat for vernal pool branchiopods. Clearing and grubbing, excavation, and other construction activities could result in the destruction of vernal pools or other suitable habitats, and individuals or cysts could be crushed or buried by equipment. Impacts would be the same as described for Alternatives 1 and 3 with two exceptions. First, construction of South Road and TRR West under Alternative 2 would result in additional loss of modeled habitat and increased potential for mortality of individuals or cysts. Second, permanent loss of modeled habitat and impacts on individuals would be less under Alternative 2 because the inundation area would be smaller.

Operation

Potential changes in the hydrologic regime of vernal pool branchiopod habitat that could result from changes in topography, soil compaction, and increased amounts of impervious surfaces and potential illness or mortality of vernal pool branchiopods from new or increased contaminants would be similar under Alternative 2 as described for Alternatives 1 and 3. Impacts would be the same as described for Alternatives 1 and 3 with one exception. The larger amount of impervious surface from South Road under operation of Alternative 2 would result in potential indirect effects on additional modeled vernal pool branchiopod habitat.

Impacts from maintenance activities and disturbance at recreation areas would be the same under Alternative 2 as described for Alternatives 1 and 3.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that construction of South Road would result in additional permanent loss of suitable habitat and the smaller reservoir footprint would reduce the amount of permanent habitat loss under

Alternative 2. A net increase in the amount of suitable habitat removed would also increase the potential for mortality of individuals or cysts. Operation of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that the additional impermeable surface from South Road could result in potential indirect effects on additional modeled vernal pool branchiopod habitat. These impacts would be significant because the implementation of Alternative 2 could reduce the local populations of federally listed vernal pool branchiopods through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.1, WILD-1.2, and WILD-1.3 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on vernal pool branchiopods. With implementation of Mitigation Measures WILD-1.1, WILD, 1.2, and WILD-1.3, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on vernal pool branchiopods.

Terrestrial Invertebrates

Permanent and temporary impacts on modeled habitat for other special-status invertebrates from Alternatives 1, 2, and 3 are shown in Table 10-2b.

Table 10-2b. Acreages of Permanent and Temporary Impacts on Modeled Special-Status Terrestrial Invertebrate Habitat in the Study Area

	Alternatives 1 and 3 Permanent Impacts	Alternatives 1 and 3 Temporary Impacts	Alternative 2 Permanent Impacts	Alternative 2 Temporary Impacts
Antioch Dunes Anthicid Beetle and Sacramento Anthicid Beetle	0	0	0	<1
Valley Elderberry Longhorn Beetle	13,535	983	12,686	964
Monarch Butterfly	15,528	1,317	15,135	1,297
Crotch Bumble Bee and Western Bumble Bee	14,104	992	13,626	949

Impact WILD-1b: Antioch Dunes Anthicid Beetle and Sacramento Anthicid Beetle

Alternatives 1 and 3

Potentially suitable habitat for Antioch Dunes anthicid beetle and Sacramento anthicid beetle is present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 1 or 3 would not result in result in direct impacts on Antioch Dunes anthicid beetle or Sacramento anthicid beetle because construction activities would not be conducted in or near potentially suitable habitat.

Operation

The average (system-wide) decrease in monthly average flow between the No Action Alternative and operations under Alternative 1 or 3 is approximately 2% and diversions would occur only under higher flow regimes in the Sacramento River. Operational impacts on the geomorphic regime (including natural river geomorphic processes such as sediment transport and bank erosion) and existing river geomorphic characteristics (e.g., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian vegetation) of the greater Sacramento River system are expected to be minimal. The overall volume of water available and the pattern of water diversion in the Sacramento River would generally be similar to the amount and pattern of water diversion under existing conditions. Minimal changes to the natural river geomorphic processes and existing geomorphic characteristics of the Sacramento River would not affect potentially suitable habitat for Antioch Dunes anthicid beetle or Sacramento anthicid beetle (sandy banks and sand bars).

Impacts on Antioch Dunes anthicid beetle and Sacramento anthicid beetle from maintenance activities are not expected to occur because maintenance activities would be conducted mostly in previously disturbed areas using existing roadways.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would not result in any impacts on Antioch Dunes anthicid beetle or Sacramento anthicid beetle because there would be no work in potentially suitable habitat for these species. Operation of Alternative 1 or 3 would not result in indirect impacts on these anthicid beetles because changes in natural river geomorphic processes and existing geomorphic characteristics would be minor and would not affect existing potential habitat. There would be no impact.

NEPA Conclusion

Construction and operation of Alternative 1 or 3 would result in no effect on Antioch Dunes anthicid beetle and Sacramento anthicid beetle.

Alternative 2

Potentially suitable habitat for Antioch Dunes anthicid beetle and Sacramento anthicid beetle is present along the Sacramento River in the operations study area and at the location of the Sacramento River discharge.

Construction

Construction of Alternative 2 would result in the permanent loss and temporary disturbance of potentially suitable habitat for Antioch Dunes anthicid beetle and Sacramento anthicid beetle (Table 10-2b). There is potentially suitable habitat for these species at the Sacramento River discharge location.

Installation of rock slope protection would result in the permanent and temporary losses of potentially suitable habitat for Antioch Dunes anthicid beetle and Sacramento anthicid beetle. Individuals could also be crushed or buried by equipment or rock.

Operation

Operation effects on Antioch Dunes anthicid beetle and Sacramento anthicid beetle under Alternative 2 would be the same as for Alternatives 1 and 3.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in the permanent loss and temporary disturbance of potentially suitable habitat for Antioch Dunes anthicid beetle and Sacramento anthicid beetle and mortality of individuals. These impacts would be significant because the construction of Alternative 2 could reduce the local populations of these rare beetles through direct mortality and habitat loss. Antioch Dunes anthicid beetle has been extirpated from Antioch Dunes and both anthicid beetle species have limited distributions (California Department of Fish and Wildlife 2021a). Implementation of Mitigation Measure WILD-1.4 and WILD-1.5 would reduce the level of impact to less than significant because potentially suitable habitat would be assessed and surveyed by a qualified entomologist prior to removal or disturbance and suitable habitat that would not be affected would be protected and avoided during construction. If occupied habitat is removed, an equivalent amount of habitat would be restored or preserved in the vicinity of the affected area. There would be no impact on Antioch Dunes anthicid beetle and Sacramento anthicid beetle from operations under Alternative 2.

Mitigation Measure WILD-1.4: Evaluate and Survey Potential Habitat for Antioch Dunes Anthicid and Sacramento Anthicid Beetles and Implement Protective Measures

The Authority will employ a qualified entomologist (experienced with anthicid beetle identification and habitat suitability) to assess and survey the area of potentially suitable habitat for Antioch Dunes anthicid and Sacramento anthicid beetles prior to the start of construction of the Sacramento River discharge. If suitable habitat is not present or no Antioch Dunes anthicid and Sacramento anthicid beetles are observed and the entomologist concurs that no further surveys are needed, no further actions are required. If either beetle species is observed, the entomologist will relocate the beetles to suitable habitat outside of the impact area. The entomologist will report observations of either beetle species to CDFW. The Authority will protect any suitable habitat in the vicinity of

the work area that will not be affected with fencing or stakes and flagging. No construction related foot or vehicle traffic will be allowed in the fenced or flagged area. The Authority will remove fencing when construction of the Sacramento River discharge is complete.

Mitigation Measure WILD-1.5: Compensate for the Loss of Occupied Antioch Dunes Anthicid and Sacramento Anthicid Beetle Habitat

The Authority will compensate for the permanent loss of occupied Antioch Dunes anthicid beetle and/or Sacramento anthicid beetle habitat by restoring or preserving an equivalent amount of habitat along the Sacramento River in the vicinity of the affected area. The Authority will employ a qualified entomologist to assess habitat to be restored or preserved and provide guidance on habitat restoration. The Authority will retain a qualified entomologist to monitor the restored or preserved habitat annually for a minimum of 5 years to ensure that habitat conditions are maintained and that the habitat has not been degraded. The Authority will submit monitoring reports to the CDFW annually.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on Antioch Dunes anthicid beetle and Sacramento anthicid beetle. With implementation of Mitigation Measures WILD-1.4 and WILD-1.5, effects would be reduced to no adverse effect. There would be no effect on Antioch Dunes anthicid beetle and Sacramento anthicid beetle from operations under Alternative 2.

Impact WILD-1c: Valley Elderberry Longhorn Beetle

Alternatives 1 and 3

Modeled habitat for valley elderberry longhorn beetle is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline. Potential habitat is also present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled habitat for valley elderberry longhorn beetle (Table 4-10b). Removal of elderberry shrubs would result in the permanent and temporary losses of valley elderberry longhorn beetle habitat. Elderberry shrubs could also die after filling of the Sites Reservoir if they are present in the inundation area. Removal or trimming of elderberry shrubs could result in injury or mortality

of valley elderberry longhorn beetle. Ground disturbance within 20 feet of an elderberry shrub's dripline could damage to its roots and result in stress or reduced vigor of the shrub.

Operation

Potential indirect effects on valley elderberry longhorn beetle that were considered were altered hydrology, loss of connectivity to adjacent habitat, and disturbance from maintenance activities. Reduction of water to elderberry shrubs as a result of altered hydrology from changes in topography or compaction of soils could result in reduced shrub vigor/vitality and an associated decrease in shoot, leaf, and flower production that could ultimately reduce the suitability of the shrubs to provide habitat for valley elderberry longhorn beetle. Loss of connectivity between elderberry shrubs may result when elderberries or associated vegetation is removed. Removal of such vegetation could result in gaps in vegetation that are too wide for valley elderberry longhorn beetle to travel across due to their fairly limited movement distances (Talley et al. 2006), resulting in separation of individuals or a reduction in the possibility of colonization of adjacent areas.

Maintenance activities required for operation of Project facilities could result in impacts on valley elderberry longhorn beetle. Impacts are generally expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas that likely have few elderberry shrubs present. Maintenance activities involving herbicide and pesticide use could cause mortality of elderberry shrubs or illness or mortality of valley elderberry longhorn beetle, respectively. Elderberry shrubs could also be inadvertently removed or trimmed during maintenance activities.

The average (system-wide) decrease in monthly average flow between the No Action Alternative and operations under Alternative 1 or 3 is approximately 2% and diversions would occur only under higher flow regimes in the Sacramento River. Operational impacts on the geomorphic regime (including natural river geomorphic processes such as sediment transport and bank erosion) and existing river geomorphic characteristics (e.g., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian vegetation) of the greater Sacramento River system are expected to be minimal. The overall volume of water available and the pattern of water diversion in the Sacramento River (and therefore the canals, Yolo Bypass, and the Delta) would generally be similar to the amount and pattern of water diversion under existing conditions. Minimal changes to the natural river geomorphic processes and existing geomorphic characteristics for the Sacramento River and downstream of the river would not affect elderberry shrubs and valley elderberry longhorn beetle.

Stone Corral Creek would receive bypass flows from the reservoir from an outlet on the Sites Dam and Funks Creek would receive augmented flow from the Funks pipelines to its reaches immediately upstream of Funks Reservoir. Bypass flows would range from 0 to 100 cubic feet per second (cfs), with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). The increase of flow in each drainage would support the existing geomorphic functions and characteristics of each channel. While increased flows from

bypass releases may result in minor increases in erosion and changes in sediment deposition, the changes are expected to be minimal and no impacts on elderberry shrubs or valley elderberry longhorn beetle are anticipated.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on valley elderberry longhorn beetle from removal of suitable habitat and loss of individuals. Operation could result in indirect effects on valley elderberry longhorn beetle from altered hydrology, loss of connectivity to adjacent habitat, and disturbance from maintenance activities. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local population of this federally listed species through direct mortality and habitat loss. The greatest historical threat to valley elderberry longhorn beetle has been the elimination, loss, or modification of its habitat by urban, agricultural, or industrial development, and other activities that reduce or eliminate its host plants (Talley et al. 2006:21–22). Implementation of Mitigation Measures WILD-1.6, WILD-1.7, WILD-1.8, and WILD-1.9 would reduce the level of impact to less than significant because surveys would be conducted to determine presence, elderberry shrubs to be protected would be fenced, and compensation would be provided for permanent loss of habitat.

Mitigation Measure WILD-1.6: Conduct Surveys for Suitable Valley Elderberry Longhorn Beetle Habitat

The Authority will employ qualified biologists or botanists (i.e., with elderberry/valley elderberry longhorn beetle experience) to conduct surveys to identify and map locations of elderberry shrubs in work areas and within 165 feet of the work areas. For shrubs located in non-riparian areas, elderberry stems will be examined for the presence of valley elderberry beetle exit holes. This information will be used to determine the amount of compensation required for the loss of elderberry shrubs in accordance with the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus)* (U.S. Fish and Wildlife Service 2017a). The biologist will mark elderberry shrubs in or within 165 feet of work areas with flagging for future removal or protection.

Mitigation Measure WILD-1.7: Fence Elderberry Shrubs to be Protected

Elderberry shrubs in or within 165 feet of work areas that will not be removed will be protected during construction. If not already marked, a qualified biologist will flag the elderberry shrubs that will be protected during construction. The Authority will install orange construction barrier fencing or stakes and flagging at the edge of the buffer areas established for each shrub and signs indicating the potential for beetle presence and excluding any Project activity within the buffer areas will be posted prior to the start of work. The buffer area distances will be proposed by the biologist and approved by

USFWS. No construction activities will be permitted in the buffer area other than those activities necessary to erect the fencing or stakes and flagging.

If orange construction barrier fencing is used, it will be placed such that there is at least a 1-foot gap between the ground and the bottom of the orange construction fencing to minimize the potential for snakes and other ground-dwelling animals to become caught in the fencing. Buffer areas around elderberry shrubs will be inspected periodically by a qualified biologist until Project construction is complete or until the fences or staking/flagging are removed, as approved by the biological monitor and the resident engineer. The Authority will be responsible for maintaining the buffer area fences around elderberry shrubs throughout construction and removing the fencing or taking and flagging when construction is complete. Biological inspection reports will be provided to the Authority.

Mitigation Measure WILD-1.8: Transplant Permanently Affected Elderberry Shrubs and Compensate for Loss of Valley Elderberry Longhorn Beetle and its Habitat

Before construction begins, the Authority will employ a qualified contractor to transplant elderberry shrubs that cannot be avoided to a USFWS-approved conservation bank or other approved area in accordance with the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus)* (U. S. Fish and Wildlife Service 2017). Elderberry shrubs that cannot be avoided will be transplanted during the plant's dormant phase (November through the first 2 weeks of February). A qualified biological monitor will remain onsite while the shrubs are being transplanted. Additionally, the Authority will provide compensatory mitigation for the loss of suitable riparian habitat at a minimum ratio of 3:1 (acres of compensation: acres of permanent impact) and for all acres that will be permanently affected. The Authority will provide compensatory mitigation for all suitable non-riparian habitat at a minimum ratio of 1:1 for all acres that will be permanently affected, or as determined during ESA Section 7 consultation with USFWS.

Mitigation Measure WILD-1.9: Protect Special-status Invertebrates and their Host and Food Plants from Herbicide and Pesticide Use

To minimize impacts on valley elderberry longhorn beetle, monarch butterfly, Crotch bumble bee, and western bumble bee from herbicide drift, herbicide application will be limited to areas immediately adjacent to Project facilities and will be conducted using handheld equipment. Herbicides and pesticides will be applied only by applicators with current licenses and/or certifications from the California Department of Pesticide Regulation. The applicator will follow the herbicide label directions. Spray nozzles will be kept within 24 inches of target vegetation during spraying. The most current information on herbicide toxicity on wildlife will be used to inform future decisions about herbicide and pesticide use during operations.

NEPA Conclusion

Construction of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 1 or 3 would result in a substantial adverse effect on valley elderberry longhorn beetle. With implementation of Mitigation Measures WILD-1.6, WILD-1.7, WILD-1.8, and WILD-1.9, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on valley elderberry longhorn beetle.

Alternative 2

Modeled habitat for valley elderberry longhorn beetle is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR West, TRR/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline, and the Sacramento River discharge. Potential habitat is also present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 2 would result in the permanent loss of modeled habitat for valley elderberry longhorn beetle (Table 4-10b). Removal of elderberry shrubs would result in the permanent and temporary losses of valley elderberry longhorn beetle habitat, and potential injury or mortality of individuals. Ground disturbance within 20 feet of an elderberry shrub's dripline could result in disturbance of roots, which could cause stress or reduced vigor of elderberry shrubs. Impacts would be the same as described for Alternatives 1 and 3 with two exceptions. The construction of the new South Road, TRR West, and the Sacramento River discharge under Alternative 2 would result in additional loss of potential habitat. The permanent impacts on potential habitat would be less under Alternative 2 because the inundation area would be smaller. Additional removal of potential habitat would also result in an increased potential for injury or mortality of valley elderberry longhorn beetle.

Operation

Potential indirect effects on valley elderberry longhorn beetle from altered hydrology, loss of connectivity to adjacent habitat, and disturbance from maintenance activities would be similar under Alternative 2 as described for Alternatives 1 and 3. Impacts on valley elderberry beetle from operation would be the same as described for Alternatives 1 and 3 with one exception. Construction of South Road under Alternative 2 could result in indirect effects on additional potential valley elderberry longhorn beetle habitat from altered hydrology or loss of connectivity because of the additional roadway that would be constructed under this alternative.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge would result in additional permanent loss of suitable habitat and the smaller reservoir footprint would reduce the amount of permanent habitat loss under Alternative 2. A net increase in the amount of suitable habitat removed would also increase the potential for mortality of individuals. Operation of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that the addition of South Road could result in more elderberry shrubs being affected by changes in hydrology and loss of connectivity to adjacent habitat. These impacts would be significant because the implementation of Alternative 2 could reduce the local valley elderberry longhorn beetle population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.6, WILD-1.7, WILD-1.8, and WILD-1.9 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on valley elderberry longhorn beetle. With implementation of Mitigation Measures WILD-1.6, WILD-1.7, WILD-1.8, and WILD-1.9, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on valley elderberry longhorn beetle.

Impact WILD-1d: Monarch Butterfly

Alternatives 1 and 3

Modeled habitat for monarch butterfly is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and Sacramento River in the operations study area.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled habitat for monarch butterfly (Table 10-4b). Construction of Alternatives 1 and 3 facilities could result in the permanent and temporary losses of suitable roosting, foraging, and breeding habitats for monarch butterfly. Potentially suitable habitat would be lost when the Sites Reservoir was inundated. Clearing and grubbing, excavation, and other construction activities could result in mortality of adults or larvae from being crushed or buried by equipment. Adult monarch butterflies could be struck by vehicles and construction equipment traveling along access roads during construction if foraging or flying through the area. Construction could also disrupt roosting or foraging activities.

Operation

Maintenance activities required for operation of Alternatives 1 and 3 could result in impacts on monarch butterfly. Impacts are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. However, maintenance activities involving herbicide and pesticide use have the potential to affect monarch butterfly and its larval host plants (native milkweeds) and nectar plants and cause the loss of habitat or individuals. Monarch butterflies could also be struck by vehicles and equipment traveling along access roads during operation.

The recreation areas and reservoir would be used on a regular basis, which would result in an increased human presence in these areas. There is potential for visitors to access undeveloped areas and disturb existing habitat (e.g., walk through habitat, remove nectar plants). Larval butterflies could be crushed by visitors walking through habitat and suitable nectar plants could be removed or stepped on by visitors.

New roadways, once completed, could increase the potential mortality of monarch butterfly from being struck by vehicles of workers traveling to operations facilities or those of visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on monarch butterfly from removal of suitable habitat and loss of individuals. Operation of Alternative 1 or 3 could result in mortality of adult butterflies from vehicle strikes, illness or injury of adults or larvae from pesticide use, or death of nectar plants from herbicide use. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local monarch butterfly population. The western population of monarch butterfly, located in California, has experienced precipitous decline from about 1.2 million in 1997 to fewer than 30,000 in 2019 (U.S. Fish and Wildlife Service 2020) as a result of habitat loss at breeding and overwintering sites, disease, pesticides, and climate change (U.S. Fish and Wildlife Service 2019). Implementation of Mitigation Measures WILD-1.9, WILD-1.10, and WILD-1.11 would reduce the level of impact to less than significant because surveys would be conducted to identify patches of native milkweeds and nectar plants, temporarily disturbed habitat would be restored, and permanent loss of habitat containing native milkweeds and/or nectar plants would be compensated for through offsite habitat restoration or preservation.

Mitigation Measure WILD-1.9: Protect Special-status Invertebrates and their Host and Food Plants from Herbicide and Pesticide Use

This measure is described above for valley elderberry longhorn beetle.

Mitigation Measure WILD-1.10: Assess Habitat Suitability and Survey for Presence of Monarch Butterfly Nectar and Larval Host Plants

During special-status plant surveys (Mitigation Measure VEG-1.1), botanists will identify and map locations and species of milkweed and/or nectar plants that would be permanently or temporarily affected by construction.

Mitigation Measure WILD-1.11: Compensate for Loss of Monarch Butterfly Nectar and Larval Host Plants

The Authority will compensate for permanent loss of suitable monarch butterfly habitat (as identified through implementation of Mitigation Measure WILD-1.10) by including native milkweed and nectar plants for monarch butterfly in offsite mitigation plans for sensitive natural communities (Mitigation Measure VEG-2.2). The Authority will compensate for permanent loss of suitable monarch butterfly habitat by planting native milkweed and nectar plants in offsite restoration or preservation areas at a minimum ratio of 1:1 (acres lost: acres planted). The offsite restoration areas would provide suitable habitat constituents for monarch butterfly (e.g., roosting habitat, nectar plants, native milkweed, water).

The Authority will compensate for temporary loss of suitable monarch butterfly habitat by including native milkweed and nectar plants in planting palettes for onsite restoration of sensitive natural communities (Mitigation Measure VEG-2.2) or temporarily disturbed grassland, or by planting native milkweed and nectar plants in the Project buffer if these plants cannot be feasibly included in the planting palettes for the temporarily disturbed areas.

Habitat will be maintained in the onsite and offsite restoration/preservation areas by periodically re-seeding the areas with native milkweed and nectar plants as needed. The Authority will establish a monitoring program that defines the frequency of monitoring, success criteria, and reporting requirements.

NEPA Conclusion

Construction of Alternative 1 or 3 would result in the same effects as described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 1 or 3 would result in a substantial adverse effect on monarch butterfly. With implementation of Mitigation Measures WILD-1.9, WILD-1.10, and WILD-1.11, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on monarch butterfly.

Alternative 2

Modeled habitat for monarch butterfly is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR West, TRR/Funks pipelines, Funks Reservoir, inundation area, I/O

Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, Sacramento River discharge, and Sacramento River in the operations study area.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for monarch butterfly (Table 4-10b). Impacts would be the same as described for Alternatives 1 and 3 with three exceptions. Construction of South Road and TRR West under Alternative 2 would result in additional loss of modeled habitat. Permanent impacts on modeled habitat would be less under Alternative 2 because the inundation area would be smaller. Under Alternative 2, construction of the Sacramento River discharge would result in permanent loss of additional habitat. Additional removal of potential habitat could also result in an increased potential for mortality of adults or larvae from being crushed or buried by equipment, or of adults from being struck by vehicles and equipment traveling along access roads during construction.

Operation

Potential effects on monarch butterfly as a result of operation would be the same under Alternative 2 as described for Alternatives 1 and 3.

CEQA Significance Determination and Mitigation Measures

Construction and operation of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge would result in additional permanent loss of potential habitat, and the smaller reservoir footprint would reduce the amount of permanent habitat loss under Alternative 2. A net increase in the amount of potential habitat removed would also increase the potential for mortality of adults or larvae from being crushed or buried by equipment or adults being struck by vehicles and equipment traveling along access roads. These impacts would be significant because the implementation of Alternative 2 could reduce the local population of monarch butterfly through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.9, WILD-1.10, and WILD-1.11 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on monarch butterfly. With implementation of Mitigation Measures WILD-1.9, WILD-1.10, and WILD-1.11, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on monarch butterfly.

Impact WILD-1e: Crotch Bumble Bee and Western Bumble Bee

Alternatives 1 and 3

Modeled habitat for Crotch bumble bee and western bumble bee is present at the GCID Main Canal improvements, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled Crotch bumble bee and western bumble bee habitat (Table 10-4b). Potentially suitable habitat would also be lost when the reservoir was inundated. Clearing and grubbing, excavation, and other activities could result in the destruction of nests or mortality of bees from being crushed or buried by equipment. Crotch and western bumble bees could also be struck by vehicles and equipment traveling along access roads during construction.

Operation

Maintenance activities required for operation of Alternatives 1 and 3 facilities could result in impacts on Crotch bumble bee and western bumble bee. Impacts are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas using existing roadways. However, maintenance activities involving herbicide and pesticide use have the potential to affect Crotch and western bumble bees and their food plants and cause the loss of habitat or illness or mortality of individuals. Crotch and western bumble bees could also be struck by vehicles and equipment traveling along access roads during operation.

The recreation areas and reservoir would be used on a regular basis, which would result in an increased human presence in these areas, as well as additional roadway traffic, which could result in increased vehicle strikes. There is potential for visitors to access undeveloped areas and disturb existing habitat (e.g., walk through habitat, removal of nectar plants). Individual bees could be stepped on or their nests could be buried or collapsed. Suitable food plants could also be removed or stepped on by visitors walking through habitat.

New roadways, once completed, could increase the potential mortality of Crotch and western bumble bees from being struck by workers traveling to operations facilities or visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction and operation of Alternative 1 or 3 would result in significant impacts on Crotch bumble bee and western bumble bee from removal of potential habitat and loss of individuals. These impacts would be significant because Alternative 1 or 3 could reduce the local populations of these rare bumble bees through direct mortality and habitat loss. Although not federally or state-listed, Crotch bumble bee and western bumble bee are considered endangered with

extinction throughout their ranges. Recent studies have shown that these species have experienced significant reductions in both their range and relative abundance and are far less common than they were historically in areas where the species persist (The Xerces Society 2018:5). Implementation of Mitigation Measures WILD-1.9, WILD-1.12 and WILD-1.13 would reduce the level of impact to less than significant because surveys would be conducted to identify patches of native food plants, temporarily disturbed habitat would be restored, and permanent loss of habitat containing suitable native food plants would be compensated for through offsite habitat restoration or preservation.

Mitigation Measure WILD-1.9: Protect Special-status Invertebrates and their Host and Food Plants from Herbicide and Pesticide Use

This measure is described above for valley elderberry longhorn beetle.

Mitigation Measure WILD-1.12: Assess Habitat Suitability and Survey for Presence of Crotch Bumble Bee and Western Bumble Bee Food Plants

During special-status plant surveys (Mitigation Measure VEG-1.1), botanists will identify and map locations of patches of native plants in the taxa most commonly associated with Crotch bumble bee and western bumble bee that would be permanently or temporarily affected by construction.

Mitigation Measure WILD-1.13: Compensate for Loss of Crotch Bumble Bee and Western Bumble Bee Habitat

The Authority will compensate for permanent loss of suitable bumble bee foraging habitat (as identified through implementation of Mitigation Measure WILD-1.12) by including suitable native nectar- and pollen-producing plants commonly used as food sources by Crotch and western bumble bees in offsite mitigation plans for sensitive natural communities (Mitigation Measure VEG-2.2). Native plants of the following genera are appropriate for Crotch bumble bee: *Antirrhinum*, *Asclepias*, *Phacelia*, *Chaenactis*, *Clarkia*, *Dendromecon*, *Eriogonum*, *Eschscholzia*, *Lupinus*, *Medicago*, and *Salvia*. Native plants of the following taxa are appropriate for western bumble bee: *Asteraceae*, *Ceanothus*, *Centaurea*, *Chrysothamnus*, *Cirsium*, *Eriogonum*, *Geranium*, *Grindelia*, *Lupinus*, *Melilotus*, *Monardella*, *Rubus*, *Penstemon*, *Solidago*, and *Trifolium*. The Authority will compensate for permanent loss of suitable Crotch and western bumble bee habitat by planting native bumble bee food plants in offsite restoration or preservation areas at minimum ratio of 1:1 (acres lost: acres planted).

The Authority will compensate for temporary loss of suitable Crotch and western bumble bee habitat by including native bumble bee food plants in the aforementioned taxa in planting palettes for onsite restoration of sensitive natural communities (Mitigation Measure VEG-2.2) or temporarily disturbed grassland, or by planting suitable food plants in the Project buffer if these plants cannot be feasibly included in the planting palettes for the temporarily disturbed areas.

Habitat will be maintained in the onsite and offsite restoration/preservation areas by periodically re-seeding the areas with native bumble bee food plants as needed.

NEPA Conclusion

Construction of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 1 or 3 would result in a substantial adverse effect on Crotch bumble bee and western bumble bee. With implementation of Mitigation Measures WILD-1.9, WILD-1.12 and WILD-1.13, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on Crotch bumble bee and western bumble bee.

Alternative 2

Modeled habitat for Crotch bumble bee and western bumble bee is present at the GCID Main Canal improvements, Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and the Sacramento River discharge.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for Crotch bumble bee and western bumble bee (Table 4-10b). Impacts would be the same as described for Alternatives 1 and 3 with two exceptions. Construction of South Road, TRR West, and the Sacramento River discharge under Alternative 2 would result in additional loss of potential habitat. Permanent impacts on potential habitat would be less under Alternative 2 because the inundation area would be smaller. Under. Additional removal of potential habitat would also result in an increased potential for mortality of individuals from being crushed or buried by equipment or being struck by vehicles and equipment traveling along access roads during construction.

Operation

Potential effects on Crotch bumble bee and western bumble bee as a result of operation would be the same under Alternative 2 as described for Alternatives 1 and 3.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge would result in additional permanent loss of modeled habitat, and the smaller reservoir footprint would reduce the amount of permanent habitat loss under Alternative 2. A net increase in the amount of habitat removed would also increase the potential for individuals to be crushed or buried by equipment or struck by vehicles and equipment traveling along access roads. These impacts would be

significant because the implementation of Alternative 2 could reduce the local populations of Crotch bumble bee and western bumble bee through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.9, WILD-1.12 and WILD-1.13 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on Crotch bumble bee and western bumble bee. With implementation of Mitigation Measures WILD-1.9, WILD-1.12 and WILD-1.13, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on Crotch bumble bee and western bumble bee.

Amphibians and Reptiles

Permanent and temporary impacts on modeled habitat for special-status amphibians and reptiles from Alternatives 1, 2, and 3 are shown in Table 10-2c.

Table 10-2c. Acreages of Permanent and Temporary Impacts on Modeled Special-Status Amphibian and Reptile Habitats in the Study Area

	Alternatives 1 and 3 Permanent Impacts	**Alternatives 1 and 3 Permanent Impacts**	**Alternatives 1 and 3 Temporary Impacts**	**Alternatives 1 and 3 Temporary Impacts**	**Alternative 2 Permanent Impacts**	**Alternative 2 Permanent Impacts**	**Alternative 2 Temporary Impacts**	**Alternative 2 Temporary Impacts**
	Aquatic Habitat	Upland Habitat	Aquatic Habitat	Upland Habitat	Aquatic Habitat	Upland Habitat	Aquatic Habitat	Upland Habitat
Western Spadefoot	511	13,730	50	848	512	13,311	48	832
California Red-legged Frog	288	6,793	249	460	280	6,403	249	460
Western Pond Turtle	635	14,201	323	1,016	641	13,806	408	1,001
Giant Gartersnake	2	26	21	18	2	20	117	45

Impact WILD-1f: Western Spadefoot

Alternatives 1 and 3

Modeled habitat for western spadefoot is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, and Dunnigan Pipeline.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled western spadefoot habitat (Table 10-2c). Modeled habitat would also be lost when the reservoir was inundated. Clearing and grubbing, excavation, and other construction activities could result in destruction of burrows and mortality or injury of individuals from being crushed or buried by equipment. Western spadefoot could also be struck by vehicles and equipment traveling along access roads during construction. In addition, work in or adjacent to suitable aquatic habitats during the breeding season could destroy developing eggs and/or larvae. Construction activities and lighting could result in the disruption of foraging activities or dispersal. Spills or leaks of gasoline, oil, or other contaminants during construction could contaminate suitable habitat and cause illness or mortality of individuals. Construction of the reservoir could cause fragmentation or isolation of western spadefoot populations and create a barrier for movement between areas of suitable habitat.

Operation

Western spadefoot aquatic habitat could be indirectly affected as a result of changes in topography, compaction of soils, and increases in surface runoff from the additional impervious surfaces associated with the new facilities. These changed conditions could modify the existing hydrologic regime of modeled potential habitat in or near the affected areas. Changes in topography could result in additional water entering habitat or could interfere with existing water flow into habitats, thereby increasing or reducing the amount of water entering habitat. Changes to the length of the inundation period of habitat could affect western spadefoot reproduction.

Indirect effects on western spadefoot from new or increased amounts of contaminants such as gasoline, oil, and herbicides could enter suitable western spadefoot aquatic habitat from adjacent new or widened roads, or new facilities, could cause illness or mortality of individuals.

Impacts from maintenance activities required for operation under Alternatives 1 and 3 are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. Western spadefoot could be struck by vehicles and equipment traveling along access roads during operation, but this is unlikely to occur because western spadefoot movement primarily occurs at night.

Modeled habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. There

is potential for visitors to access undeveloped areas and disturb existing habitat (e.g., walk through habitat, increase trash). If western spadefoot was present, individuals could be crushed by visitors walking through habitat. In addition, increased human activity at the recreation areas and near the reservoir could cause western spadefoot to avoid habitat in these areas. There is also potential for the introduction of exotic invasive species (e.g., bullfrogs [*Lithobates catesbeianus*], red-eared sliders [*Trachemys scripta elegans*]) from visitors releasing these animals at recreation areas or into the reservoir, which could compete with or prey on western spadefoot.

New roadways, once completed, could impede movement and increase the potential mortality of western spadefoot from being struck by the vehicles of workers traveling to operations facilities or visitors traveling to recreation areas. The presence of the reservoir could cause fragmentation or isolation of western spadefoot populations and create a barrier for movement between areas of suitable habitat.

Safety lighting would be installed at the dams, bridge, and recreation areas. Lighting could cause western spadefoot to avoid using areas illuminated by these new sources of light or modify its movement pathways to avoid the lighted areas. Lighting could also make western spadefoot more vulnerable to predation. A BMP for permanent lighting specifies that safety lighting would be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on western spadefoot.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on western spadefoot from removal of potential habitat and loss of individuals. Operation of Alternative 1 or 3 could affect potential western spadefoot aquatic habitat as a result of changes in topography, soil compaction, and increased amounts of impervious surfaces, which could modify the existing hydrologic regime of the aquatic habitat. Operations of Alternative 1 or 3 could result in disturbance of habitat or introduction of exotic invasive species at recreation areas, or mortality of individuals from being struck by the vehicles of personnel or recreationists. These impacts would be significant because implementation of Alternatives 1 and 3 could reduce the local western spadefoot population through direct mortality and habitat loss. Western spadefoot has been eliminated from a portion of its range as a result of urban and agricultural development and additional habitat losses are expected (Morey 2005:516–517). Implementation of Mitigation Measures WILD-1.2, WILD-1.3, WILD-1.14, and VEG-2.2, and VEG-3.2 would reduce the level of impact to less than significant because surveys would be conducted to determine presence, disturbance of seasonal wetlands would be avoided during the rainy season, and compensation would be provided for the permanent and temporary losses of suitable habitat.

Mitigation Measure WILD-1.2: Avoid and Minimize Potential Effects on Vernal Pool Branchiopods and Western Spadefoot

This measure is described above for vernal pool branchiopods.

Mitigation Measure WILD-1.3: Compensate for Impacts on Vernal Pool Branchiopod Habitat

This measure is described above for vernal pool branchiopods.

Mitigation Measure WILD-1.14: Assess Habitat Suitability and Survey Suitable Habitat for Western Spadefoot, California Red-legged Frog, and Western Pond Turtle

The Authority will employ qualified biologists to assess habitat suitability and conduct surveys for western spadefoot, California red-legged frog, and western pond turtle in the Project area and where potentially suitable habitat is within 300 feet of the Project area where impacts from operation may occur. Qualified biologists are defined as those who have experience evaluating habitat and conducting focused surveys for western spadefoot, California red-legged frog, and western pond turtle. The surveys will be conducted in accordance with the following conditions.

- Western spadefoot habitat assessments and surveys of seasonal wetland habitat will be conducted during vernal pool branchiopod habitat assessments and surveys (Mitigation Measure WILD-1.1).
- Habitat assessment and surveys for California red-legged frog will be conducted in accordance with the *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog*, which provide direction for site assessments and recommend up to eight surveys that are conducted over a period of 9–12 months (U.S. Fish and Wildlife Service 2005b). Habitat assessment and surveys for western pond turtle and western spadefoot (intermittent streams) will be conducted concurrently with the California red-legged frog surveys.

The qualified biologists will prepare and submit reports describing the methods and results of the habitat assessments and surveys to the Authority, CDFW, and USFWS.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.4.

NEPA Conclusion

Construction of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 1

or 3 would result in a substantial adverse effect on western spadefoot. With implementation of Mitigation Measures WILD-1.2, WILD-1.3, WILD-1.14, VEG-2.2, and VEG-3.2, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on western spadefoot.

Alternative 2

Modeled habitat for western spadefoot is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR West, TRR/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, and Dunnigan Pipeline.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for western spadefoot (Table 10-2c). Impacts would be similar to those under Alternatives 1 and 3 with two exceptions. Construction of South Road and TRR West under Alternative 2 would result in additional loss of potential habitat. Permanent impacts on potential habitat would be less under Alternative 2 because the inundation area would be smaller. Additional removal of potential habitat would also result in an increased potential for injury or mortality of western spadefoot. There would also be a larger area that could be affected by construction lighting and potential contamination from spills or leaks of gasoline, oil, or other contaminants during construction.

Operation

Potential effects on western spadefoot from operation would be similar under Alternative 2 to Alternatives 1 and 3. Under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Because additional roadway would be constructed under Alternative 2, the greater amount of roadway would impede western spadefoot movement over a larger area and increase the potential for individuals spadefoot to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that construction of South Road and TRR West would result in additional permanent loss of potential habitat and the smaller reservoir footprint would reduce the amount of permanent habitat loss under Alternative 2. A net increase in the amount of habitat removed would also increase the potential for individuals to be crushed or buried by equipment or struck by vehicles and equipment traveling along access roads. Operation of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that the increased amount of roadway would impede movement over a larger area. These impacts would be significant because the implementation of Alternative 2 could reduce the local western spadefoot population through direct mortality and

habitat loss. Implementation of Mitigation Measures WILD-1.2, WILD-1.3, WILD-1.14, VEG-2.2, and VEG-3.2 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on western spadefoot. With implementation of Mitigation Measures WILD-1.2, WILD-1.3, WILD-1.14, and VEG-2.2, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on western spadefoot.

Impact WILD-1g: California Red-legged Frog

Alternatives 1 and 3

Modeled habitat for California red-legged frog is present at the Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, and recreation areas.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled habitat for California red-legged frog (Table 10-2c). Clearing and grubbing, excavation, and other construction activities could result in destruction of burrows, and mortality or injury of individuals from being crushed or buried by equipment. California red-legged frog could be struck by vehicles and equipment traveling along access roads during construction. In addition, work in or adjacent to suitable aquatic habitats during the breeding season could destroy developing eggs and/or larvae. Construction activities and lighting could also result in disruption of foraging activities or dispersal. Spills or leaks of gasoline, oil, or other contaminants during construction could contaminate suitable habitat and cause illness or mortality of individuals.

Operation

New or increased amounts of contaminants such as gasoline, oil, and herbicides could enter suitable California red-legged frog aquatic habitat from adjacent new or widened roads, or new facilities, which could cause illness or mortality of eggs or individuals.

Impacts from maintenance activities required for operation under Alternatives 1 and 3 are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. If present, California red-legged frog could be struck by vehicles and equipment traveling along access roads during operation, but this is unlikely to occur because California red-legged frog movement mostly occurs at night.

Modeled habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. There is potential for visitors to access undeveloped areas and disturb existing habitat (e.g., walk through habitat, increase trash). If California red-legged frog was present, individuals could be crushed by visitors walking through habitat. In addition, increased human activity at the recreation areas and near the reservoir could cause California red-legged frog to avoid habitat in these areas. There is also potential for the introduction of exotic invasive species (e.g., bullfrogs, red-eared sliders) from visitors releasing these animals at recreation areas or into the reservoir, which could compete with or prey on California red-legged frog.

New roadways could impede movement and increase the potential for mortality of California red-legged frog from being struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas. The presence of Sites Reservoir under Alternatives 1 and 3 would be an ongoing impediment to movement of California red-legged frog. If California red-legged frogs are present in the aquatic features directly east of the reservoir, presence of the reservoir could cause fragmentation of the California red-legged frog population and create a barrier for California red-legged frog movement between these aquatic features and suitable habitat directly west of the reservoir.

Safety nighttime lighting would be installed at the dams, Funks Reservoir, bridge, and recreation areas, where modeled habitat is present. Lighting could cause California red-legged frog to avoid using areas illuminated by these new sources of light or modify its movement pathways to avoid the lighted areas. Lighting could also make California red-legged frog vulnerable to predation. A BMP for permanent lighting specifies that safety lighting would be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on California red-legged frog.

Stone Corral Creek would receive bypass flows from the reservoir through an outlet on the Sites Dam and Funks Creek would receive augmented flow from the Funks pipelines to its reaches immediately upstream of Funks Reservoir. Bypass flows would range from 0 to 100 cfs, with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). The increase of flow in each drainage would support the existing geomorphic functions (i.e., flow regime, sediment transport, and bank erosion) and characteristics (i.e., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian vegetation) of each channel. Because the bypass flows would emulate natural conditions and would not exceed 100 cfs, they would not substantially change the length of time that there is flow in the creeks or the length of ponding in the creeks. The addition of impervious surfaces would not substantially alter the existing drainage patterns of a site or area because of the limited area of impervious surfaces and the ability of the surrounding open area to infiltrate precipitation. While increased flows from bypass releases may result in minor increases in erosion and changes in sediment deposition, the changes are expected to be minimal and no impacts on California red-legged frog are expected.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 could result in significant impacts on California red-legged frog from removal of modeled habitat and potential loss of individuals. Operation of Alternative 1 or 3 could affect California red-legged frog as a result of new or increased contaminants entering habitat, vehicle strikes, disturbance of habitat or injury or mortality of individuals at recreation areas, and impeded movement from new roadways. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local California red-legged frog population through direct mortality and habitat loss. California red-legged frog has been extirpated from approximately 70% of its historical range, with severe declines occurring primarily in the Central Valley and southern California (U.S. Fish and Wildlife Service 2002:1, 4–5). Implementation of Mitigation Measures WILD-1.14, WILD-1.15, and WILD-1.16 would reduce the level of impact to less than significant because surveys would be conducted to determine presence, protective measures would be implemented during construction, and compensation would be provided for the permanent and temporary losses of suitable habitat.

Mitigation Measure WILD-1.14: Assess Habitat Suitability and Survey Suitable Habitat for Western Spadefoot, California Red-legged Frog, and Western Pond Turtle

This mitigation measure is described above for western spadefoot.

Mitigation Measure WILD-1.15: Implement California Red-legged Frog Protective Measures

If California red-legged frog is found in the Project area either incidentally or during surveys conducted in accordance with Mitigation Measure WILD-1.14, the Authority will implement the following protective measures.

- Occupied aquatic habitat will not be removed or filled until California red-legged frogs have been relocated to suitable habitat outside of disturbance areas or other steps are taken to avoid mortality of individuals or effects on the population as determined during ESA Section 7 consultation with USFWS.
- Occupied aquatic habitat that will not be removed or disturbed will be protected with exclusion fencing along the edge of the work area a minimum of 200 feet from the aquatic habitat. The fencing will be installed to prevent individuals from entering the work area but will not completely enclose the pond or exclude dispersal to and from the pond. The USFWS-approved biologist will assist with preparing the fence plans and will be present during installation. The fencing will be installed to a depth of 6 inches and be at least 30 inches above grade. The contractor will avoid placing fencing on top of ground squirrel burrows. The fence will be pulled taut at each support to prevent folds or sagging. A USFWS-approved biologist will also walk all fence lines daily to look for individuals stranded along fence lines. Fencing will be

inspected and maintained in good condition throughout work and will be removed after work is complete and all construction equipment is removed from the work area.

- A USFWS-approved biologist will be present during all ground-disturbing work in California red-legged frog upland and dispersal habitats during the rainy season (generally October 15 to May 1) when frogs are dispersing. The biologist will survey work areas for frogs and for rodent burrows in potential upland habitat immediately prior to the start of any ground-disturbing work (including moving equipment into the area). If a California red-legged frog is found, it will be moved out of the work area in accordance with the USFWS biological opinion for the Project. Disturbance of suitable habitat will be minimized to the maximum extent feasible.
- In the event a California red-legged frog is trapped, construction will cease until the individual has been relocated to an appropriate location as described in a USFWS-approved relocation plan. The plan will include trapping and relocation methods, relocation sites, and post-relocation monitoring. Only USFWS-approved biologists will be allowed to relocate listed species to outside of the construction area.
- No work will occur in suitable upland or dispersal habitats during or 24 hours following a rain event. Following a rain event, no work will proceed until a USFWS-approved biologist has inspected the work areas and verified that there are no California red-legged frogs present. A rain event is to be considered precipitation of at least 0.25 inch within a 24-hour period.
- Activities in suitable upland or dispersal habitat will occur during daylight hours (from 30 minutes before sunrise to 30 minutes after sunset). Artificial lighting at a work site will be prohibited during the hours of darkness when working in suitable California red-legged frog upland/dispersal habitat, except when necessary for driver or pedestrian safety. For any night work, the driving path and work area will be surveyed for California red-legged frog immediately prior to work and nighttime work will be monitored by a USFWS-approved biologist.

Mitigation Measure WILD-1.16: Compensate for Permanent and Temporary Losses of Occupied California Red-legged Frog Aquatic and Upland Habitats

The Authority will compensate for the permanent and temporary losses of occupied California red-legged frog aquatic habitat and associated upland habitat through the purchase of mitigation credits at a USFWS-approved conservation bank or through acquiring and protecting habitat in perpetuity at a location approved by USFWS. Permanent impacts will be mitigated at a 3:1 ratio (habitat restored or preserved: habitat affected) and temporary impacts will be mitigated at a 1:1 ratio (habitat restored or preserved: habitat affected), or as required by the biological opinion from USFWS for the Project. Details of the compensatory mitigation will be further developed in consultation with USFWS.

NEPA Conclusion

Construction of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 1 or 3 would result in a substantial adverse effect on California red-legged frog. With implementation of Mitigation Measures WILD-1.14, WILD-1.15, and WILD-1.16, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on California red-legged frog.

Alternative 2

Modeled habitat for California red-legged frog is present at the TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, and recreation areas.

Construction

Construction of Alternative 2 would result in the permanent loss of modeled aquatic and upland habitat for California red-legged frog (Table 10-2c). Impacts would be similar to those for Alternatives 1 and 3 with two exceptions. Construction of South Road and TRR West under Alternative 2 would result in additional loss of potential habitat. Permanent impacts on potential habitat would be less under Alternative 2 because the inundation area would be smaller. Additional removal of potential habitat would also result in an increased potential for injury or mortality of California red-legged frog. There would also be a larger area that could be affected by construction lighting and potential contamination from spills or leaks of gasoline, oil, or other contaminants during construction.

Operation

Potential operation effects on California red-legged frog under Alternative 2 would be similar to those under Alternatives 1 and 3. Under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Because additional roadway would be constructed under Alternative 2, the greater amount of roadway would impede movement over a larger area and increase the potential for California red-legged frog to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that construction of South Road and TRR West would result in additional permanent loss of modeled habitat and the smaller reservoir footprint would reduce the amount of permanent habitat loss under Alternative 2. A net increase in the amount of habitat removed would also increase the potential for individuals to be crushed or buried by equipment or struck by vehicles and equipment traveling along access roads. The operation impacts of Alternative 2 would be similar to those for Alternatives 1 and 3 except that the increased amount of roadway would impede

movement over a larger area. These impacts would be significant because the implementation of Alternative 2 could reduce the local California red-legged frog population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.14, WILD-1.15, and WILD-1.16 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on California red-legged frog. With implementation of Mitigation Measures WILD-1.14, WILD-1.15, and WILD-1.16, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on California red-legged frog.

Impact WILD-1h: Western Pond Turtle

Alternatives 1 and 3

Modeled habitat western pond turtle is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East, TRR East/Funks pipelines, Funks Reservoir, Sites Reservoir, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline. Potential habitat is also present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled habitat for western pond turtle (Table 10-2c). Clearing and grubbing, excavation, and other construction activities could result in the destruction of nest sites and mortality or injury of eggs or individuals from being crushed or buried by equipment. Western pond turtle could be struck by vehicles and equipment traveling along access roads during construction. Construction activities could also result in disruption of foraging activities or dispersal. Spills or leaks of gasoline, oil, or other contaminants during construction could contaminate suitable aquatic habitat and cause illness or mortality of individuals.

Operation

Under Alternative 1 or 3, new or increased amounts of contaminants such as gasoline, oil, and herbicides could enter suitable western pond turtle aquatic habitat from adjacent new or widened roads, or new facilities, which could cause illness or mortality of individuals.

Impacts on western pond turtle from routine maintenance activities are not expected because maintenance activities would be conducted mostly in previously disturbed areas during daylight hours and using existing roadways. If present, western pond turtle could be struck by vehicles and equipment traveling along access roads during operation.

Modeled habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. There is potential for visitors to access undeveloped areas and disturb existing habitat (e.g., walk through habitat, increase trash). In addition, increased human activity at the recreation areas and near the reservoir could cause western pond turtle to avoid habitat in these areas.

New roadways, once completed, could create barriers to movement and increase the potential for western pond turtle to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas.

The decrease in monthly average flow in the Sacramento River because of diversion would be approximately 2% under Alternative 1 or 3. The effects of the decreased flows on the geomorphic regime and geomorphic characteristics of the river are expected to be minimal. The overall volume of water and drainage pattern in the Sacramento River (and the downstream Yolo Bypass and Delta) would be similar to existing conditions. The minor changes that would result from diversions from the Sacramento River would not affect western pond turtle or its aquatic and upland habitat.

Stone Corral and Funks Creeks would have increased flows that would range from 0 to 100 cfs, with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). These flow increases would support the existing geomorphic functions and characteristics of each channel. Because the bypass flows would emulate natural conditions and would not exceed 100 cfs, they would not substantially change the length of time that there is flow in the creeks or the length of ponding in the creeks. The addition of impervious surfaces would not substantially alter the existing drainage patterns of a site or area because of the limited area of impervious surfaces and the ability of the surrounding open area to infiltrate precipitation. While increased flows from bypass releases may result in minor increases in erosion and changes in sediment deposition, the changes are expected to be minimal and no impacts on western pond turtle are expected.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on western pond turtle from removal of potential habitat and potential loss of individuals. Operation of Alternative 1 or 3 could affect western pond turtle as a result of new or increased contaminants entering habitat, vehicle strikes, disturbance of habitat at recreation areas, and new roads creating barriers to movement. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local western pond turtle population through direct mortality and habitat loss. Western pond turtle populations have declined substantially, although they are still found within most of their historical range in California (Yarnal 2019:10–13). Implementation of Mitigation Measures WILD-1.14, WILD-1.17, VEG-2.2, VEG-3.1, VEG-3.2, and VEG-3.3 would reduce the level of impact to less than significant because surveys would be conducted to identify suitable habitat, qualified biologists would conduct preconstruction surveys and monitor initial

work in suitable aquatic habitat, and compensation would be provided for the permanent and temporary losses of suitable habitat.

Mitigation Measure WILD-1.14: Assess Habitat Suitability and Survey Suitable Habitat for Western Spadefoot, California Red-legged Frog, and Western Pond Turtle

This measure is described above for western spadefoot.

Mitigation Measure WILD-1.17: Conduct Preconstruction Surveys for Western Pond Turtle and Monitor Initial In-Water Work

The Authority will employ qualified biologists (i.e., experienced in the identification of and knowledge of the life history and habitats of western pond turtle) to conduct preconstruction surveys within 24 hours of the start of activities that disturb occupied or suitable western pond turtle aquatic habitat. The biologist will survey the aquatic habitat and adjacent marsh, riparian, and grassland habitat in the construction area. If in-water work does not start immediately, the biologist will return to the construction site immediately prior to the start of in-water work to conduct another preconstruction survey. The biologist will remain onsite until initial in-water work is complete. If a turtle becomes trapped during initial in-water work, a biologist who is CDFW-approved to capture and relocate turtles during construction of the Project will relocate the individual to suitable aquatic habitat upstream or downstream of the construction area. The construction crew will be instructed to notify the crew foreman who will contact the biologist if a turtle is found trapped in the construction area. Work in the area where the turtle is trapped will stop until the biologist arrives and removes and relocates the turtle. The biologist will report their activities to CDFW within 1 day of relocating any turtle.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.1: Avoid and Minimize Disturbance of Wetlands and Non-Wetland Waters During Construction Activities

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.3: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters

This measure is described in Chapter 9, Section 9.4.

NEPA Conclusion

Construction of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 1 or 3 would result in a substantial adverse effect on western pond turtle. With implementation of Mitigation Measures WILD-1.14, WILD-1.17, VEG-2.2, VEG-3.1, VEG-3.2, and VEG-3.3, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on western pond turtle.

Alternative 2

Suitable habitat for western pond turtle is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR/Funks pipelines, TRR West, Funks Reservoir, Sites Reservoir, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and the Sacramento River discharge. Potential habitat is also present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 2 would result in the permanent loss of modeled aquatic and upland habitat for western pond turtle (Table 10-2c). Impacts would be similar to those for Alternatives 1 and 3 with two exceptions. Construction of South Road, TRR West, and the Sacramento River discharge under Alternative 2 would result in additional loss of potential habitat. Permanent impacts on potential habitat would be less under Alternative 2 because the inundation area would be smaller. Additional removal of habitat would also result in an increased potential for injury or mortality of western pond turtle. There would be a larger area that could be affected by potential contamination from spills or leaks of gasoline, oil, or other contaminants during construction.

Operation

Potential effects on western pond turtle from operation would be similar under Alternative 2 as described for Alternatives 1 and 3. Under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Because additional roadway would be constructed under Alternative 2, the greater amount of roadway would impede movement over a larger area and increase the potential for western pond turtle to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge would result in additional permanent loss of modeled habitat. A net increase in the amount of potential habitat removed would also increase the potential for individuals to be crushed or buried by equipment or struck by vehicles and equipment traveling along access roads. Operation of Alternative 2 would be the same as Alternatives 1 and 3 except that the increased amount of roadway would impede movement over a larger area. These impacts would be significant because the implementation of Alternative 2 could reduce the local western pond turtle population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.14, WILD-1.17, VEG-2.2, VEG-3.1, VEG-3.2, and VEG-3.3 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on western pond turtle. With implementation of Mitigation Measures WILD-1.14, WILD-1.17, VEG-2.2, VEG-3.1, VEG-3.2, and VEG-3.3, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on western pond turtle.

Impact WILD-1i: Giant Gartersnake

Alternatives 1 and 3

Modeled habitat for giant gartersnake is present at the GCID Main Canal diversion, GCID Main Canal improvements, road improvements, TC Canal intake, and Dunnigan Pipeline.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of potential giant gartersnake habitat (Table 10-2c). Clearing and grubbing, excavation, structure improvements associated with road improvements, and other construction activities could result in the destruction of burrows and mortality or injury of individuals from being crushed or buried by equipment. Giant gartersnake could be struck by vehicles and equipment traveling along access roads during construction. Construction activities could also result in disruption of foraging activities or dispersal. Spills or leaks of gasoline, oil, or other contaminants during construction could contaminate suitable aquatic habitat and cause illness or mortality of individuals.

Operation

Under Alternative 1 or 3, new or increased amounts of contaminants such as gasoline, oil, and herbicides could enter suitable giant gartersnake aquatic habitat from adjacent new or widened roads, or new facilities, which could cause illness or mortality of individuals.

Maintenance activities required for operation of Alternative 1 or 3 facilities could result in impacts on giant gartersnake. For most areas of operation, impacts are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas using existing roadways. Maintenance of ditches or waterway crossings that provide suitable giant gartersnake habitat could result in injury or mortality of individuals. If present, giant gartersnake could be struck by vehicles and equipment traveling along access roads during operation.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on giant gartersnake from removal of suitable habitat and potential loss of individuals. Operation of Alternative 1 or 3 could injure or kill giant gartersnakes during maintenance of waterway structures or if individuals are struck by vehicles during maintenance activities. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local giant gartersnake population through direct mortality and habitat loss. Giant garternake distribution and abundance has declined in the San Joaquin Valley and giant gartersnake abundance has declined in the Sacramento Valley (U.S. Fish and Wildlife Service 2017:I-9). Implementation of Mitigation Measures WILD-1.18, WILD-1.19, and WILD-1.20 would reduce the level of impact to less than significant because construction in suitable habitat would be conducted during this species' active period to the extent feasible, surveys would be conducted to determine presence of giant gartersnake, construction would be suspended if giant gartersnakes are observed in work areas, additional measures would be implemented to avoid causing giant gartersnake injury and mortality, and compensation would be provided for the permanent and temporary losses of suitable aquatic and upland habitat.

Mitigation Measure WILD-1.18: Implement Protective Measures for Giant Gartersnake

The Authority will implement the following protective measures when working in or near giant gartersnake habitat or as otherwise specified in the biological opinion from USFWS and incidental take permit from CDFW for the Project.

- To the maximum extent possible, all construction activity in giant gartersnake aquatic and upland habitat within 200 feet of aquatic habitat will be conducted during the snake's active period (between May 1 and October 1). During this timeframe, potential for injury and mortality are reduced because snakes are actively moving and avoiding danger. For work that cannot be conducted between May 1 and October 1, additional protective measures will be determined during consultation with USFWS and CDFW.

- The movement of heavy equipment within 200 feet of the banks of potential giant gartersnake aquatic habitat will be confined to designated haul routes to minimize habitat disturbance.
- Vegetation clearing within 200 feet of the banks of suitable giant gartersnake aquatic habitat will be limited to the minimum area necessary. Avoided giant gartersnake habitat in or adjacent to the Project area will be flagged and designated as an activity exclusion zone, to be avoided by all construction personnel.
- To reduce the likelihood of snakes entering the construction area, exclusion fencing will be installed along the edge of the construction area within 200 feet of suitable aquatic habitat. The exclusion fencing will be installed during the active period for giant gartersnakes (May 1 to October 1) to reduce the potential for injury and mortality during this activity. The exclusion fencing will consist of 3-foot-tall silt fencing buried 4 to 6 inches below ground level.
- A USFWS- and CDFW-approved biologist will conduct a preconstruction survey of work areas within 200 feet of giant gartersnake habitat no more than 24 hours before the start of work.
- Prior to construction activities each morning, construction personnel will inspect exclusion and orange barrier fencing to ensure they are both in good working order. If any snakes are observed in the construction area during this inspection or at any other time during construction, the USFWS- and CDFW-approved biologist will be contacted to survey the site for snakes. The work area will be re-inspected and surveyed whenever a lapse in construction activity of 2 weeks or more has occurred. If a snake (believed to be a giant gartersnake) is encountered during construction, activities will cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed.

Mitigation Measure WILD-1.19: Restore Temporarily Disturbed Giant Gartersnake Aquatic and Upland Habitat to Pre-Project Conditions

Upon completion of the construction, the Authority will employ a qualified contractor to restore temporarily affected suitable giant gartersnake aquatic and upland habitats to pre-Project conditions. Restoration of aquatic vegetation and annual grassland will be detailed in a mitigation and monitoring plan that will be reviewed and approved by USFWS and CDFW prior to the start of construction.

Mitigation Measure WILD-1.20: Compensate for Permanent and Temporary Losses of Giant Gartersnake Aquatic and Upland Habitats

The Authority will compensate for the permanent and temporary losses of suitable giant gartersnake aquatic habitat and associated upland habitat through the purchase of mitigation credits at a USFWS- and CDFW-approved conservation bank or through acquiring and protecting habitat in perpetuity at a location approved by USFWS and

CDFW. Permanent impacts will be mitigated at a 3:1 ratio 1 (habitat restored or preserved: habitat affected) and temporary impacts will be mitigated at a 1:1 ratio (habitat restored or preserved: habitat affected), or as required by the biological opinion from USFWS and the incidental take permit from CDFW for the Project. Details of the compensatory mitigation will be further developed in consultation with USFWS and CDFW.

NEPA Conclusion

Construction of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 1 or 3 would result in a substantial adverse effect on giant gartersnake. With implementation of Mitigation Measures WILD-1.18, WILD-1.19, and WILD-1.20, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on giant gartersnake.

Alternative 2

Modeled habitat for giant gartersnake is present at the GCID Main Canal diversion, GCID Main Canal improvements, new and widened roadways, TC Canal intake, Dunnigan Pipeline, and the Sacramento River discharge.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for giant gartersnake (Table 10-2c). Impacts would be similar to those under Alternatives 1 and 3 except that additional habitat would be permanently lost because of the extended Dunnigan Pipeline and construction of the Sacramento River discharge under Alternative 2. Additional removal of habitat would also result in an increased potential for injury or mortality of giant gartersnake. There would also be a larger area that could be affected by contamination from spills or leaks of gasoline, oil, or other contaminants during construction.

Operation

Potential effects on giant gartersnake from operation would be similar under Alternative 2 to those described for Alternatives 1 and 3 except that additional maintenance activities at the Sacramento River discharge could result in additional potential for injury or mortality of giant gartersnakes.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to those under Alternatives 1 and 3 except that extension of the Dunnigan Pipeline and construction of the Sacramento River discharge would result in permanent loss of additional habitat. A net increase in the amount of habitat removed would also increase the potential for individuals to be crushed or buried by

equipment or struck by vehicles and equipment traveling along access roads. Operation of Alternative 2 could also result in additional potential for injury or mortality of giant gartersnakes from maintenance activities at the Sacramento River discharge. These impacts would be significant because the implementation of Alternative 2 could reduce the local giant gartersnake population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.18, WILD-1.19, and WILD-1.20 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on giant gartersnake. With implementation of Mitigation Measures WILD-1.18, WILD-1.19, and WILD-1.20, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on giant gartersnake.

Birds

Permanent and temporary impacts on modeled habitat for special-status birds from Alternatives 1, 2, and 3 are shown in Table 10-2d.

Table 10-2d. Acreages of Permanent and Temporary Impacts on Modeled Special-Status Bird Habitats in the Study Area

	Alternatives 1 and 3 Permanent Impacts	Alternatives 1 and 3 Permanent Impacts	Alternatives 1 and 3 Temporary Impacts	Alternatives 1 and 3 Temporary Impacts	Alternative 2 Permanent Impacts	Alternative 2 Permanent Impacts	Alternative 2 Temporary Impacts	Alternative 2 Temporary Impacts
	Nesting Habitat	**Foraging Habitat**	**Nesting Habitat**	**Foraging Habitat**	**Nesting Habitat**	**Foraging Habitat**	**Nesting Habitat**	**Foraging Habitat**
Golden Eagle	1,006	13,096	43	929	946	12,731	43	889
Swainson's Hawk and White-tailed Kite	1,083	14,171	50	1,036	969	13,615	50	1,015
Mountain Plover	N/A	14,152	N/A	994	N/A	13608	N/A	942
Bank Swallow	0	15,649	0	1,419	0	15,088	0	1,469
Tricolored Blackbird	42	13,487	19	1,043	43	12,933	16	1,113
	Nesting and Foraging		**Nesting and Foraging**		**Nesting and Foraging**		**Nesting and Foraging**	
Northern Harrier	14,273		1,084		13,711		1,154	
Burrowing Owl	13,986		989		13,469		966	
Bald Eagle	427		253		502		253	
Western Yellow-billed Cuckoo	0		0		0		0	
Yellow-breasted Chat and Yellow Warbler	71		8		104		8	
Song Sparrow ("Modesto" Population)	112		28		147		24	

Impact WILD-1j: Northern Harrier and Burrowing Owl

Alternatives 1 and 3

Modeled habitat for northern harrier and burrowing owl is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled northern harrier and burrowing owl habitats (Table 10-2d). Habitat loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation. Clearing and grubbing, excavation, and other construction activities could result in destruction of nests and burrows or nest abandonment, which could cause injury or mortality of eggs or nestlings.

Nighttime construction lighting could temporarily disturb active nest sites if they are in the illuminated area. Noise and vibration from operation of vehicles and equipment, and presence of construction crews could result in temporary disturbance of active northern harrier and burrowing owl nests and foraging activities. Rock quarries and batch plants in the inundation area and dam and dike footprints, drill and blast activities for tunneling at the I/O Works site, and CIDH pile drilling for the bridge would result in additional temporary disturbance from noise and vibration in those areas.

Operation

Impacts from maintenance activities required for operation of Alternative 1 or 3 facilities are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. Suitable northern harrier nesting habitat is not anticipated to be located near facilities that would be maintained, and noise and other disturbances from maintenance are not expected to affect nesting northern harriers. If burrowing owls were nesting near the facilities, they could be disturbed by noise, vibrations, or presence of maintenance workers. Use of rodenticides at the facilities could cause illness or mortality of northern harrier or burrowing owl because they could feed on rodents that have ingested rodenticide.

The new transmission lines installed for the reservoirs could cause mortality of northern harrier and burrowing owl through electrocution.

Modeled habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. Although most of the human activity would be in the developed areas, there is potential for visitors to access undeveloped areas, which could increase proximity of visitors to nests and

disturb nesting activities. In addition, increased noise and activity in developed and undeveloped areas could cause northern harrier and burrowing owl to avoid foraging or nesting in the recreation areas or in suitable habitat near the reservoir.

Safety nighttime lighting would be installed at the TRR East, Funks Reservoir, Sites Reservoir, bridge, dams, recreation areas, TC Canal intake, and CBD outlet. Artificial lighting could deter northern harrier or burrowing owl from nesting in illuminated areas. A BMP would be implemented to reduce operation impacts on nest sites by directing new facility lighting to reduce light spill and glare in surrounding areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on northern harrier and burrowing owl from removal of modeled habitat and potential loss or disturbance of active nests. Operation of Alternatives 1 and 3 could result in disturbance of northern harrier and burrowing owl from human-generated noise and disturbance at recreation areas and near the reservoir, or illness or morality of northern harrier or burrowing owl from ingestion of rodents that have consumed rodenticide. Collision with new transmission lines could cause injury or death of individuals from electrocution. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local northern harrier and burrowing owl populations through direct mortality and habitat loss. Conversion of wetlands and pasturelands in the Central Valley has resulted in a decline of northern harrier and local extirpations. Ground nests are particularly vulnerable to disturbance or destruction by human activity, and to predation by wild and domestic animals (Shuford and Gardali 2008:152–153). Burrowing owl populations have declined in central and southern coastal breeding areas, and the species has experienced modest breeding range reductions statewide. Burrowing owl population declines are attributed to the loss, degradation, and modification of suitable habitat, and the eradication of ground squirrels that provide the owls with burrows for nesting, protection from predators, and shelter (California Department of Fish and Game 2012:1).

Implementation of Mitigation Measures WILD-1.21, WILD-1.22, WILD-1.23, WILD-1.24, WILD-1.25, WILD-1.26, VEG-2.2, and VEG 3.2 would reduce the level of impact to less than significant because vegetation would be removed during the nonbreeding season, surveys would be conducted to determine if northern harrier and burrowing owl are nesting (or for burrowing owl, wintering) in or near work areas, no-disturbance buffers would be established around active nest (or wintering) sites, and impacts on sensitive natural communities in which northern harriers or burrowing owls may nest or forage would be compensated for through habitat restoration or protection.

Mitigation Measure WILD-1.21: Conduct Vegetation Removal during the Non-Breeding Season of Nesting Migratory Birds

The Authority will, to the maximum extent feasible, remove trees, shrubs, and herbaceous vegetation during the non-breeding season for most migratory birds

(generally between October 1 and January 31). Removing vegetation during this period is highly preferable because if an active nest is found during preconstruction surveys (Mitigation Measure WILD-1.22) in vegetation (e.g., tree) that would be removed during construction, the vegetation cannot be removed until the end of the nesting season, which could delay construction. If vegetation cannot be removed between October 1 and the end of January, or if ground cover re-establishes in areas where vegetation has been removed, the affected area will be surveyed for nesting birds, as discussed in Mitigation Measure WILD-1.22.

Mitigation Measure WILD-1.22: Conduct Preconstruction Surveys for Nesting Migratory Birds and Implement Protective Measures if Found

For special-status species where survey protocols have been established by CDFW, USFWS, or technical advisory committees, those survey protocols will supersede this measure (i.e., Mitigation Measures WILD-1.23, WILD-1.27, and WILD-1.28 for burrowing owl, golden eagle/bald eagle, and Swainson's hawk/white-tailed kite). The Authority will employ qualified wildlife biologists with knowledge of the relevant species to conduct nesting bird surveys before the start of construction. A minimum of two separate surveys will be conducted for migratory birds, including raptors. Surveys for nesting migratory birds will include examining all potential nesting habitat in and within 50 feet of work areas on foot and/or using binoculars. The survey area for nesting raptors will encompass potential habitat within 500 feet of work areas. If possible, the first survey will be conducted during the height of the breeding season (March 1 to June 1) and the second survey will be conducted within 1 week prior to the start of construction. If no active nests are detected during these surveys, no additional measures are required.

If an active nest is found in the survey area, a no-disturbance buffer will be established around the nest site to avoid disturbance or destruction of the site until the end of the breeding season (September 30) or until after a qualified wildlife biologist determines that the young have fledged and moved out of the Project area (this date varies by species). The extent of these buffers will be determined by the biologist in coordination with USFWS and CDFW and will depend on the level of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. Suitable buffer distances may vary between species. If it is determined that the no-disturbance buffer cannot be maintained, the Authority and the qualified biologist will consult with USFWS and CDFW about implementing alternative protective measures such as a reduced buffer with full-time nest monitoring by a qualified biologist.

Mitigation Measure WILD-1.23: Conduct Surveys for Western Burrowing Owl Prior to Construction and Implement Avoidance and Minimization Measures if Found

The Authority will employ qualified biologists (experienced at identification of burrowing owls and their habitat) to conduct burrowing owl surveys in accordance with CDFW's *2012 Staff Report on Burrowing Owl Mitigation* (2012 Staff Report) (California Department of Fish and Game 2012). Biologists will conduct four surveys during the breeding season as follows: (1) one survey between February 15 and April 15, and (2) a minimum of three surveys at least 3 weeks apart between April 15 and July 15, with at least one survey after June 15. Biologists will also conduct four surveys spread evenly throughout the non-breeding season (September 1 to January 31). A report describing the methods and results of the survey will be submitted to CDFW within 30 days of completing the surveys.

The Authority will employ qualified biologists to conduct preconstruction take avoidance surveys for active burrows according to methodology in the 2012 Staff Report. If burrowing owls are found during any of the surveys, the Authority will implement Mitigation Measure WILD-1.24, which requires habitat to be replaced at a conservation area before permanent impacts occur. Because ample lead time is necessary to acquire and protect replacement habitat, these efforts should begin as soon as possible after presence of burrowing owls is determined.

Regardless of results from the surveys described above, take avoidance (preconstruction) surveys will be conducted no less than 14 days prior to and 24 hours before initiating ground-disturbing activities (i.e., two surveys).

Because burrowing owls may re-colonize a site after a few days, subsequent surveys will be conducted if more than 2 days pass between Project activities. If no burrowing owls are found, no further mitigation is required. If burrowing owls are found, the Authority will implement the following measures summarized from the 2012 Staff Report.

- Occupied burrows will not be disturbed during the breeding season (February 1–August 31).
- A 250-foot-wide buffer area will be established around occupied burrows. No construction will be authorized within the buffer unless a qualified biologist determines through non-invasive methods that egg laying and incubation have not begun or that juveniles are foraging independently and are capable of independent survival.
- To the maximum extent possible, burrows occupied during the non-breeding season by migratory or non-migratory resident burrowing owls will be avoided.

- To the maximum extent possible, destruction of unoccupied burrows in temporary impact areas will be avoided, and visible markers will be placed near burrows to ensure they are not collapsed.
- Occupied burrows that cannot be avoided will have exclusion devices installed and be collapsed. Burrow exclusion will be conducted only by qualified biologists during the non-breeding season, before breeding behavior is exhibited and after the burrow is confirmed empty by site surveillance and/or scoping.
- Qualified biologists will conduct additional take avoidance surveys, as described above.
- Qualified biologists will monitor the Project site for burrowing owls during Project construction activities.
- Impacts on burrowing owls and their habitat will be minimized by using buffer areas, visual screens, and other measures during Project construction activities. Recommended buffer distances in the 2012 Staff Report will be used or site-specific buffers and visual screens will be determined through information collected during site-specific monitoring and consultation with CDFW.
- Fumigation, treated bait, or other means of poisoning nuisance animals will not be used in areas where burrowing owls are known or suspected to occur (e.g., sites observed with nesting owls, designated use areas).
- Use of treated grain to poison mammals will be restricted to the months of January and February.

Mitigation Measure WILD-1.24: Restore Temporarily Disturbed Habitat and Compensate for the Permanent Loss of Occupied Burrowing Owl Habitat

If burrowing owls have been documented to occupy burrows at the Project site in the last 3 years, CDFW considers the site occupied and mitigation is required.

Where habitat will be temporarily disturbed, the Authority will restore the disturbed area to pre-Project conditions, including soil decompaction and revegetation. Prior to any activities that would result in permanent impacts on occupied habitat for burrowing owl, the Authority will acquire replacement habitat and permanently protect the habitat in accordance with the 2012 Staff Report. Mitigation will be provided at a minimum 1:1 ratio, but the final ratios will be determined through coordination with CDFW. Replacement habitat will be established through a conservation easement and/or credits will be purchased at a CDFW-approved conservation bank. For mitigation land under a conservation easement, a mitigation land management plan will be prepared to ensure the long-term success of the habitat and will require monitoring and reporting. The Authority will fund the maintenance and management of mitigation land through the establishment of a long-term funding mechanism such as an endowment. A qualified biologist or CDFW may determine that permanent habitat protection may be warranted if there is

potential that temporary effects may render a nesting site (nesting burrow and satellite burrows) unsustainable or unavailable, depending on the timeframe, resulting in reduced survival or abandonment.

Mitigation Measure WILD-1.25: Protect Special-status Wildlife from Rodenticide Use

To minimize the potential for wildlife to be poisoned by ingesting rodenticide, use of rodenticides will be minimized to the maximum extent feasible and limited to areas immediately surrounding Project facilities. Facilities will be maintained in a manner to reduce the potential for nuisance rodents, including sealing openings in structures, securely storing trash bins, and installing signage at recreation areas discouraging feeding of wildlife and encouraging disposal of food and other trash in designated containers. Wherever feasible, alternatives to rodenticide will be used for rodent eradication, such as traps, if they can be used safely around other wildlife.

Mitigation Measure WILD-1.26: Construct Overhead Power Lines and Associated Equipment Following Suggested Practices to Reduce Bird Collisions with Power Lines

The Authority will ensure that new transmission lines and associated equipment will be properly fitted with wildlife protective devices to isolate and insulate structures to prevent injury or mortality of birds. Protective measures shall follow the guidelines provided in *Reducing Avian Collisions with Power Lines: The State of the Art* (Avian Power Line Interaction Committee 2012), or the current guidelines in place at the time the transmission lines are installed, and will include insulating hardware or conductors against simultaneous contact, using poles that minimize impacts to birds, and increasing the visibility of conductors or wires to prevent or minimize bird collisions.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.4.

NEPA Conclusion

Construction of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 1 or 3 would result in a substantial adverse effect on northern harrier and burrowing owl. With implementation of Mitigation Measures WILD-1.21, WILD-1.22, WILD-1.23, WILD-1.24,

WILD-1.25, WILD-1.26, VEG 2.2, and VEG 3.2, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on northern harrier and burrowing owl.

Alternative 2

Modeled habitat for northern harrier and burrowing owl are present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and the Sacramento River discharge.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of nesting and foraging habitats for northern harrier and burrowing owl (Table 10-2d) and potential destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings.

Potential impacts on northern harrier and burrowing owl under Alternative 2 would be similar to those for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge under Alternative 2 would result in additional loss of modeled habitat and permanent impacts on habitat would be less under Alternative 2 because the inundation area would be smaller. Additional removal of potential habitat would also result in an increased potential for destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings.

Operation

Potential effects on northern harrier and burrowing owl from operation would be the same under Alternative 2 as described for Alternatives 1 and 3.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those under Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge would result in additional permanent loss of modeled habitat, and the smaller reservoir footprint would reduce the amount of permanent habitat loss under Alternative 2. A net increase in the amount of habitat removed would also increase the potential for destruction of nests and burrows or nest abandonment, which could cause injury or mortality of eggs or nestlings. Operation of Alternative 2 would result in the same impacts as those described above for Alternatives 1 and 3. These impacts would be significant because the implementation of Alternative 2 could reduce the local northern harrier and burrowing owl populations through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.21, WILD-1.22, WILD-1.23, WILD-1.24, WILD-1.25, WILD-1.26, VEG 2.2, and VEG 3.2 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on northern harrier and burrowing owl. With implementation of Mitigation Measures WILD-1.21, WILD-1.22, WILD-1.23, WILD-1.24, WILD-1.25, WILD-1.26, VEG 2.2, and VEG 3.2, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on northern harrier or burrowing owl.

Impact WILD-1k: Golden Eagle and Bald Eagle

Alternatives 1 and 3

Modeled habitat for golden eagle and bald eagle is present at the GCID Main Canal improvements, TRR East/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, and recreation areas. Additional modeled habitat for golden eagle is present at the TC Canal intake. Modeled bald eagle habitat is also present at the GCID Main Canal diversion, TRR East Reservoir, and Dunnigan Pipeline. Potential bald eagle nesting habitat is also present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled nesting and foraging habitats for golden eagle and bald eagle (Table 10-2d). Habitat loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation. Clearing and grubbing, excavation, and other construction activities could result in destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings.

Nighttime construction lighting could temporarily disturb active nest sites if they are in the illuminated area. Noise and vibration from operation of vehicles and equipment, and presence of construction crews could result in temporary disturbance of active golden eagle and bald eagle nests and foraging activities. Rock quarries and batch plants in the inundation area and dam and dike footprints, drill and blast activities for tunneling at the I/O Works site, and CIDH pile drilling for the bridge would result in additional temporary disturbance from noise and vibration in those areas.

Operation

Maintenance activities required for operation under Alternative 1 or 3 could result in impacts on golden eagle and bald eagle. While small mammals are not their preferred prey, bald eagles could become ill or die from eating rodents that have ingested rodenticides used at the facilities. Use of rodenticides at the facilities could also cause illness or mortality of golden eagle from eating rodents that have ingested rodenticide. Noise and vibration from vehicles and equipment,

and presence of maintenance crews could disturb golden eagles or bald eagles if maintenance activities are near active nests. Although maintenance activities would be temporary and short term, they could result in disturbance of active nests if conducted during a sensitive period in the nesting process (e.g., when eaglets are learning to fly).

The new transmission lines installed for the reservoirs could cause mortality of golden eagle and bald eagle through electrocution.

Modeled habitat for golden eagle and bald eagle is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. Although most of the activity would be in the developed areas, there is potential for visitors to access undeveloped areas, which could increase proximity of visitors to nests and disturb nesting activities. In addition, increased noise and activity in developed and undeveloped areas could cause golden eagle and bald eagle to avoid foraging or nesting in the recreation areas or in suitable habitat near the reservoir.

Safety nighttime lighting would be installed at the TRR East Reservoir, Funks Reservoir, Sites Reservoir, bridge, dams, recreation areas, and CBD outlet where suitable nesting habitat may be present. Lighting could deter golden eagles or bald eagles from nesting in areas that are illuminated by these new sources of light. A BMP for permanent lighting specifies that safety lighting would be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on golden eagle and bald eagle nesting.

The decrease in monthly average flow in the Sacramento River because of diversion would be approximately 2% under Alternative 1 or 3. The effects of the decreased flows on the geomorphic regime and geomorphic characteristics of the river are expected to be minimal. The overall volume of water and drainage pattern in the Sacramento River (and the downstream Yolo Bypass and Delta) would be similar to existing conditions. The minor changes that would result from diversions from the Sacramento River would not affect suitable bald eagle nesting habitat along the river or downstream waterways.

Stone Corral and Funks Creeks would have increased flows that would range from 0 to 100 cfs, with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). These flow increases would support the existing geomorphic functions and characteristics of each channel. While increased flows from bypass releases may result in minor increases in erosion and changes in sediment deposition, the changes are expected to be minimal and there would be no impacts on suitable golden eagle or bald eagle nesting habitat associated with the creeks.

The completed reservoir would provide new bald eagle foraging habitat and result in new nesting sites or wintering habitat because of the proximity to new foraging habitat. These would be beneficial effects.

CEQA Significance Determination and Mitigation Measures

Implementation of Alternative 1 or 3 would have the beneficial effects of providing new bald eagle foraging habitat (Sites Reservoir) and new nesting sites or wintering habitat because of the proximity to the new foraging habitat. Construction of Alternative 1 or 3 would result in significant impacts on golden eagle and bald eagle from removal of suitable habitat and potential loss or disturbance of active nests. Operation of Alternatives 1 and 3 may result in disturbance of bald eagle and golden eagle if nesting or foraging at or near recreation areas and the use of rodenticides could cause illness, injury, or morality of bald eagle or golden eagle if rodenticides are ingested. Collision with new transmission lines could cause injury or death of individuals from electrocution. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local golden eagle and bald eagle populations through direct mortality and habitat loss. The population trend of golden eagle in California is largely unknown, but the species is threatened by loss of foraging areas, loss of nesting habitat, pesticide poisoning, lead poisoning and collision with man-made structures such as wind turbines (California Department of Fish and Wildlife 2021e). Bald eagle population decline has been attributed to habitat modification from urban developments; agriculture; timber harvest; pesticides and contaminants, including lead poisoning; off-road vehicles and other human disturbances; electrocution and collision at power lines; and shooting (California Department of Fish and Wildlife 2021f).

Implementation of Mitigation Measures WILD-1.21, WILD-1.25, WILD-1.26, WILD-1.27, VEG-2.2, VEG-3.2, VEG-3.3, VEG-4.1, and VEG-4.2 would reduce the level of impact to less than significant because vegetation would be removed during the nonbreeding season, surveys would be conducted to determine if golden eagle and bald eagle are nesting in or near work areas, no-disturbance buffers would be established around active nest sites, and impacts on sensitive natural communities in which golden eagles and bald eagles may nest or forage would be compensated for through habitat restoration and preservation.

Mitigation Measure WILD-1.21: Conduct Vegetation Removal during the Non-Breeding Season of Nesting Migratory Birds

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.25: Protect Special-status Wildlife from Rodenticide Use

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.26: Construct Overhead Power Lines and Associated Equipment Following Suggested Practices to Reduce Bird Collisions with Power Lines

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.27: Conduct Focused Surveys for Golden Eagle and Bald Eagle and Implement Protective Measures if Found

Prior to the start of construction, the Authority will employ qualified wildlife biologists (experienced with raptor identification and behaviors) to conduct focused surveys for golden eagle and bald eagle nests in suitable habitat in the Project area and within a 2-mile radius of the Project area. The surveys will be conducted in accordance with the *Interim Golden Eagle Inventory and Monitoring Protocols; and other Recommendations* (Pagel et al. 2010), *Protocol for Evaluating Bald Eagle Habitat and Populations in California* (Jackman and Jenkins 2004), *Bald Eagle Breeding Survey Instructions* (California Department of Fish and Wildlife 2017) and *Updated Eagle Nest Survey Protocol* (U.S. Fish and Wildlife Service 2020).

Prior to conducting surveys, any known breeding area records will be reviewed, and a map of potential nest sites will be created using GIS mapping of suitable nesting habitat. If feasible, an initial survey will be conducted during the fall or winter, prior to the initial occupancy survey, to identify existing nest sites. Nest locations will be mapped using GPS software and will be used during the occupancy surveys.

For golden eagle, based on the results of the initial survey, aerial (helicopter) or ground surveys will be conducted to assess nest occupancy. A minimum of two aerial surveys or ground observation periods lasting at least 4 hours each will be conducted in a single breeding season (January 1 through August 31) to confirm presence/absence of golden eagle. Each survey will be conducted at least 30 days apart. Surveys will be conducted in the morning during favorable weather conditions.

For a bald eagle, based on the results of the initial survey, a minimum of three surveys will be conducted during the bald eagle nesting season (January 1 to July 31) in the year that construction will begin, and each year during the construction period, to look for new nests. The first survey will be conducted in the early breeding period in early March, and additional surveys will be conducted in mid-nesting season (late April or early May) and late in the season (mid-June). Surveys will be conducted in the morning, if feasible, during favorable weather conditions.

For both species, the final survey methods and survey area boundaries will be determined based on coordination with USFWS and CDFW, and all survey results will be submitted to these agencies.

If an occupied golden eagle or bald eagle nest is identified in the survey area, a no-disturbance buffer will be established around the nest site to avoid disturbance or destruction of the site within each breeding season (January 1–August 31 for golden eagle; January 1–July 31 for bald eagle) or until a qualified wildlife biologist determines that the young have fledged and the nest is no longer active. The extent of the buffer will be 1 mile or as determined by the biologist in coordination with USFWS and CDFW and

will depend on the level of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. If it is determined that the no-disturbance buffer cannot be maintained, the Authority and the qualified biologist will consult with USFWS and CDFW about implementing alternative protective measures such as a reduced buffer with full-time nest monitoring by a qualified biologist.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.3: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-4.1: Avoid and Minimize Potential Adverse Effects on Oak Woodlands During Construction

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-4.2: Compensate for Adverse Effects on Oak Woodlands

This measure is described in Chapter 9, Section 9.4.

NEPA Conclusion

Construction of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 1 or 3 would result in a substantial adverse effect on golden eagle and golden eagle. With implementation of Mitigation Measures WILD-1.21, WILD-1.25, WILD-1.26, WILD-1.27, VEG 2.2, VEG 3.2, VEG-3.3, VEG-4.1, and VEG-4.2, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on golden eagle and bald eagle.

Alternative 2

Modeled habitat for golden eagle and bald eagle is present at the GCID Main Canal improvements, TRR/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works,

dams, new and widened roadways, and recreation areas. Additional modeled habitat for golden eagle is present at the TC Canal intake. Modeled bald eagle habitat is also present at the GCID Main Canal diversion, Dunnigan Pipeline, and the Sacramento River discharge.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of potential habitat for golden eagle (Table 10-2d) and potential destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Impacts would be similar to those for Alternatives 1 and 3 except that construction of South Road, TRR West, and of the Sacramento River discharge under Alternative 2 would result in additional loss of suitable bald and golden eagle habitat and permanent impacts on suitable golden and bald eagle habitat would be less under Alternative 2 because the inundation area would be smaller. Additional removal of potential habitat would also result in an increased potential for destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings.

Operation

Potential effects on golden eagle and bald eagle from operation would be the same under Alternative 2 as described for Alternatives 1 and 3.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that construction of South Road would result in additional permanent loss of suitable golden eagle and bald eagle habitat, the smaller reservoir footprint would reduce the amount of permanent golden eagle and bald eagle habitat loss, and construction of the Sacramento River discharge would increase the amount of bald eagle habitat loss under Alternative 2. A net increase in the amount of suitable habitat removed would also increase the potential for destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Operation of Alternative 2 would result in the same impacts as those described above for Alternatives 1 and 3. These impacts would be significant because the implementation of Alternative 2 could reduce the local golden eagle and bald eagle populations through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.21, WILD-1.25, WILD-1.26, WILD-1.27, VEG-2.2, VEG-2.3,VEG-3.2, VEG-3.3, VEG-4.1, and VEG-4.2 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on bald eagle and golden eagle. With implementation of Mitigation Measures WILD-1.21, WILD-1.25, WILD-1.26, WILD-1.27, VEG-2.2, VEG-3.2, VEG-3.3, VEG-4.1, and VEG-4.2, effects would be reduced to no adverse effect. Operation of

Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on bald eagle and golden eagle.

Impact WILD-1l: Swainson's Hawk and White-tailed Kite

Alternatives 1 and 3

Modeled habitat for Swainson's hawk and white-tailed kite is present at the GCID Main Canal intake, GCID Main Canal improvements, TRR East Reservoir, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and Sacramento River in the operations study area.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled habitat for Swainson's hawk and white-tailed kite (Table 10-2d). Habitat loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation. Clearing and grubbing, excavation, and other construction activities could result in destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings.

Nighttime construction lighting could temporarily disturb active nest sites if they are in the illuminated area. Noise and vibration from operation of vehicles and equipment, and presence of construction crews could result in temporary disturbance of active Swainson's hawk and white-tailed kite nests and foraging activities. Rock quarries and batch plants in the inundation area and dam and dike footprints, drill and blast activities for tunneling at the I/O Works site, and CIDH pile drilling for the bridge would result in additional temporary disturbance from noise and vibration in those areas.

Operation

Maintenance activities required for operation Alternative 1 or 3 could result in impacts on Swainson's hawk and white-tailed kite. Noise and vibration from vehicles and equipment, and presence of maintenance crews could disturb individuals if maintenance activities are near active nests. Although maintenance activities would be temporary and short term, they could result in disturbance of active nests if conducted during a sensitive period in the nesting process (e.g., when fledglings are beginning to fly). Use of rodenticides at the facilities could cause illness or mortality of individuals because they could feed on rodents that have ingested rodenticide.

The new transmission lines installed for the reservoirs could cause mortality of Swainson's hawk and white-tailed kite through electrocution.

Modeled habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas, as well as additional roadway traffic. Although most of the activity would be in the developed

areas, there is potential for visitors to access undeveloped areas, which could increase proximity of visitors to nests and disturb nesting activities. In addition, increased noise and activity in developed and undeveloped areas could cause Swainson's hawk and white-tailed kite to avoid foraging or nesting in the recreation areas or in suitable habitat near the reservoir.

Safety nighttime lighting would be installed at the TRR East Reservoir, Funks Reservoir, Sites Reservoir, bridge, dams, recreation areas, and CBD outlet where suitable nesting habitat may be present. Lighting could deter individuals from nesting in areas that are illuminated by these new sources of light.

The decrease in monthly average flow in the Sacramento River because of diversion would be approximately 2% under Alternative 1 or 3. The effects of the decreased flows on the geomorphic regime and geomorphic characteristics of the river are expected to be minimal. The overall volume of water and drainage pattern in the Sacramento River (and the downstream Yolo Bypass and Delta) would be similar to existing conditions. The minor changes that would result from diversions from the Sacramento River would not affect suitable Swainson's hawk and white-tailed kite nesting habitat along the river or downstream waterways.

Stone Corral and Funks Creeks would have increased flows that would range from 0 to 100 cfs, with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). These flow increases would support the existing geomorphic functions and characteristics of each channel. While increased flows from bypass releases may result in minor increases in erosion and changes in sediment deposition, the changes are expected to be minimal and there would be no impacts on suitable Swainson's hawk and white-tailed kite nesting habitat associated with the creeks.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on Swainson's hawk and white-tailed kite from removal of suitable habitat and potential loss or disturbance of active nests. Operation of Alternatives 1 and 3 may result in disturbance of Swainson's hawk and white-tailed kite if nesting or foraging at or near recreation areas, and the use of rodenticides could cause illness, injury, or morality of Swainson's hawk and white-tailed kite if rodenticides are ingested. Collision with new transmission lines could cause injury or death of individuals from electrocution. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local Swainson's hawk and white-tailed kite populations through direct mortality and habitat loss. Swainson's hawk populations declined as much as 90% between the early 1900s and 1970; recent populations are still below historical numbers and this species has not reoccupied its previous range (California Department of Fish and Wildlife 2016:17, 21). Historically, white-tailed kite populations were substantially reduced by habitat loss, shooting, and egg collection, and the long-term trend suggest a continued decline (Cornell Lab of Ornithology 2019).

Implementation of Mitigation Measures WILD-1.21, WILD-1.25, WILD-1.26, WILD-1.28, WILD-29, VEG-2.2, VEG-2.3, VEG-4.1, and VEG-4.2 would reduce the level of impact to less than significant because vegetation would be removed during the nonbreeding season, surveys would be conducted to determine if Swainson's hawk or white-tailed kite is nesting in or near work areas, no-disturbance buffers would be established around active nest sites, and impacts on foraging habitat and other sensitive natural communities in which Swainson's hawk or white-tailed kite may nest or forage would be mitigated through habitat restoration and preservation.

Mitigation Measure WILD-1.21: Conduct Vegetation Removal during the Non-Breeding Season of Nesting Migratory Birds

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.25: Protect Special-status Wildlife from Rodenticide Use

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.26: Construct Overhead Power Lines and Associated Equipment Following Suggested Practices to Reduce Bird Collisions with Power Lines

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.28: Conduct Focused Surveys for Nesting Swainson's Hawk and White-tailed Kite Prior to Construction and Implement Protective Measures during Construction

The Authority will employ qualified wildlife biologists (experienced with raptor identification and behaviors) to conduct focused surveys for Swainson's hawk and white-tailed kite nesting areas before construction begins. Survey methodology will follow the Swainson's Hawk Technical Advisory Committee's methodology (Swainson's Hawk Technical Advisory Committee 2000). A minimum of six surveys will be conducted during the appropriate timeframes discussed in the methodology. If needed, the qualified biologists will coordinate with CDFW regarding the extent and number of surveys. Surveys will generally be conducted from February to July. Survey methods and results will be reported to CDFW within 30 days of the completion of the surveys.

Because the area surrounding the Project area is largely undeveloped, focused surveys for Swainson's hawk and white-tailed kite will be conducted in the Project area and in a buffer area up to 0.5 mile around the Project area. The portions of the buffer area containing unsuitable nesting habitat and/or with an obstructed line of sight to the Project area will not be surveyed.

If the biologists find an active nest, the contractor will maintain a 0.25-mile no-work buffer between construction activities and the active nest(s) until it has been determined that the young have fledged. The biologists will mark the no-work buffer with stakes and signs and will check the location at least weekly to ensure that the signs are in place and the buffer is being maintained. No work will be authorized within the buffer except for vehicle travel. If a 0.25-mile buffer around the nest cannot be maintained, the Authority and a qualified biologist will consult with CDFW about implementing alternative protective measures such as a reduced buffer with fulltime nest monitoring by a qualified biologist. If nesting raptors exhibit agitated behavior indicating stress, the biological monitor will have the authority to stop construction in that area until they determine that the young have fledged.

Mitigation Measure WILD-1.29: Compensate for the Permanent Loss of Foraging Habitat for Swainson's Hawk

The Authority will compensate for permanent loss of suitable Swainson's hawk foraging habitat by providing offsite habitat management lands as described in CDFW's *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (California Department of Fish and Game 1994). The mitigation ratio varies from 0.5:1 to 1:1 (habitat preserved for each acre lost) and depends on the distance between the Project area and the nearest active nest site (an active nest site is one that has been used in one or more of the last 5 years). Information on the nearest nest will be obtained from Swainson's hawk surveys conducted during implementation of Mitigation Measure WILD-1.28, the CNDDB, or CDFW. If acceptable to CDFW, the Authority may purchase mitigation credits for Swainson's hawk habitat from a CDFW-approved mitigation or conservation bank. The establishment or purchase of offsite habitat management lands or the purchase of mitigation credits will occur prior to the start of construction.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-4.1: Avoid and Minimize Potential Adverse Effects on Oak Woodlands During Construction

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-4.2: Compensate for Adverse Effects on Oak Woodlands

This measure is described in Chapter 9, Section 9.4.

NEPA Conclusion

Construction of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 1 or 3 would result in a substantial adverse effect on Swainson's hawk and white-tailed kite. With implementation of Mitigation Measures WILD-1.21, WILD-1.25, WILD-1.26, WILD-1.28, WILD-1.29, VEG-2.2, VEG-4.1, and VEG-4.2, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on Swainson's hawk and white-tailed kite.

Alternative 2

Modeled habitat for Swainson's hawk and white-tailed kite is present at the, GCID Main Canal diversion, GCID Main Canal improvements, TRR/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and the Sacramento River discharge. Potential bald eagle nesting habitat is also present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of potential habitat for Swainson's hawk and white-tailed kite (Table 10-2d) and potential destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Impacts would be similar to those described for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge under Alternative 2 would result in additional loss of potential nesting and foraging habitat and permanent impacts on potential nesting and foraging habitat would be less under Alternative 2 because the inundation area would be smaller. Additional removal of habitat would also result in an increased potential for destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings.

Operation

Potential effects on Swainson's hawk and white-tailed kite from operation would be the same under Alternative 2 as described for Alternatives 1 and 3.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge would result in additional permanent loss of suitable habitat, and the smaller reservoir footprint would reduce the amount of permanent habitat loss under Alternative 2. A net increase in the amount of suitable habitat removed would also increase the potential for destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Operation of Alternative 2 would result in the same impacts as those described above for Alternatives 1 and 3.

These impacts would be significant because the implementation of Alternative 2 could reduce the local Swainson's hawk and white-tailed kite populations through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.21, WILD-1.25, WILD-1.26, WILD-1.28, WILD-1.29, VEG-2.2, VEG-4.1, and VEG-4.2 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on these species. With implementation of Mitigation Measures WILD-1.21, WILD-1.25, WILD-1.26, WILD-1.28, WILD-1.29, VEG-2.2, VEG-4.1, and VEG-4.2, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on Swainson's hawk or white-tailed kite.

Impact WILD-1m: Mountain Plover

Alternatives 1 and 3

Modeled wintering habitat for mountain plover is present at the GCID Main Canal intake, GCID Main Canal improvements, TRR East/Funks pipelines, inundation area, I/O Works, dams, new and widened roadways, recreation areas, and Dunnigan Pipeline.

Construction

Construction of Alternatives 1 and 3 would result in the permanent and temporary losses of modeled mountain plover wintering habitat (Table 10-2d). Habitat loss would result from conversion to unsuitable land cover types and reservoir inundation. Potential injury or mortality of eggs or nestlings from nest destruction or nest abandonment would not occur because the area of disturbance under Alternatives 1 and 3 is outside mountain plover's nesting range.

Operation

Maintenance would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. Suitable mountain plover wintering habitat would not be in maintenance areas and operation would not result in impacts on mountain plover.

Modeled habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. Increased noise and activity in developed and undeveloped areas could cause mountain plover to avoid foraging in the recreation areas or in suitable habitat near the reservoir.

The new transmission lines installed for the reservoirs could cause mortality of mountain plover through electrocution.

CEQA Significance Determination and Mitigation Measures

Construction of Alternatives 1 and 3 would result in significant impacts on mountain plover from removal of suitable wintering habitat. Operation of Alternative 1 or 3 could result in significant impacts if mountain plovers are injured or die from electrocution from colliding with new transmission lines. These impacts would be significant because Alternative 1 or 3 could affect the local wintering mountain plover population through direct mortality and habitat loss. About half of the mountain plover wintering population occurs in California and there has been a decrease in the wintering population in the Central Valley; the loss of and inadequate management of wintering areas in California is a conservation concern for this species (Andres and Stone 2009:1, 19). Implementation of Mitigation Measures VEG-2.2 and VEG-3.2 would reduce the level of impact to less than significant because permanent loss of sensitive natural communities in which mountain plover may forage would be compensated for through habitat restoration.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.4.

NEPA Conclusion

Construction of Alternatives 1 and 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternatives 1 and 3 would result in a substantial adverse effect on mountain plover. With implementation of Mitigation Measures VEG-2.2 and VEG-3.2, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on mountain plover.

Alternative 2

Modeled habitat for mountain plover is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR/Funks pipelines, TRR West, inundation area, I/O Works, dams, new and widened roadways, recreation areas, and Dunnigan Pipeline.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled mountain plover wintering habitat (Table 10-2d). Impacts would be similar to those described for

Alternatives 1 and 3 except that permanent impacts on potential wintering habitat would be less under Alternative 2 because the inundation area would be smaller.

Operation

Potential effects on mountain plover from operation would be the same under Alternative 2 as described for Alternatives 1 and 3.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that the smaller reservoir footprint would reduce the amount of permanent habitat loss under Alternative 2. Operation of Alternative 2 would result in the same impacts as those described above for Alternatives 1 and 3. These impacts would be significant because Alternative 2 could affect the local wintering mountain plover population through direct mortality and habitat loss. Implementation of Mitigation Measures VEG-2.2 and VEG-3.2 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on mountain plover. With implementation of Mitigation Measures VEG-2.2 and VEG-3.2, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on mountain plover.

Impact WILD-1n: Western Yellow-billed Cuckoo, Yellow-breasted Chat, Yellow Warbler, and Song Sparrow (Modesto Population)

Alternatives 1 and 3

Modeled habitat for yellow-breasted chat, yellow warbler, and song sparrow (Modesto population; herein song sparrow) is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East/Funks pipelines, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline. Modeled habit for song sparrow is also present at Funks Reservoir. Potential habitat is also present for all four bird species along the Sacramento River in the operations study area.

Construction

Alternative 1 or 3 would not result in any construction impacts on modeled western yellow-billed cuckoo habitat. Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled habitat for yellow-breasted chat, yellow warbler, and song sparrow (Table 10-2d). Habitat loss would result from vegetation removal, conversion to unsuitable land cover

types, and reservoir inundation. Vegetation removal and other construction activities could result in destruction of nests, which could cause injury or mortality of eggs or nestlings.

Nighttime construction lighting could temporarily disturb active nest sites if they are in the illuminated area. Noise and vibration from operation of vehicles and equipment, and presence of construction crews could result in temporary disturbance of yellow-breasted chat, yellow warbler, and song sparrow nests and foraging activities. Rock quarries and batch plants in the inundation area and dam and dike footprints, drill and blast activities for tunneling at the I/O Works site, and CIDH pile drilling for the bridge would result in additional temporary disturbance from noise and vibration in those areas.

Operation

Alternative 1 or 3 would not result in any operation impacts on potential western yellow-billed cuckoo habitat. Maintenance would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. Noise and vibration from vehicles and equipment, and presence of maintenance crews could disturb nesting yellow-breasted chat, yellow warbler, and song sparrow if maintenance activities are near active nests. Although maintenance activities would be temporary and short term, they could result in disturbance of active nests if conducted during a sensitive period in the nesting process.

Modeled habitat for yellow-breasted chat, yellow warbler, and song sparrow is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. Although most of the activity would be in the developed areas, there is potential for visitors to access undeveloped areas, which could increase proximity of visitors to nests and disturb nesting activities. In addition, increased noise and activity in developed and undeveloped areas could cause individuals to avoid foraging or nesting in the recreation areas or in suitable habitat near the reservoir.

Safety nighttime lighting would be installed at the TRR East Reservoir, Funks Reservoir, Sites Reservoir, bridge, dams, recreation areas, TC Canal intake, and CBD outlet. Lighting could deter individuals from nesting in areas that are illuminated by these new sources of light. A BMP would be implemented to reduce operation impacts on nest sites by directing new facility lighting to reduce light spill and glare in surrounding areas.

The decrease in monthly average flow in the Sacramento River because of diversion would be approximately 2% under Alternative 1 or 3. The effects of the decreased flows on the geomorphic regime and geomorphic characteristics of the river are expected to be minimal. The overall volume of water and drainage pattern in the Sacramento River (and the downstream Yolo Bypass and Delta) would be similar to existing conditions. The minor changes that would result from diversions from the Sacramento River would not affect potential western yellow-billed cuckoo, yellow-breasted chat, yellow warbler, and song sparrow nesting habitat along the river or downstream waterways.

Stone Corral and Funks Creeks would have increased flows that would range from 0 to 100 cfs, with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). These flow increases would support the existing geomorphic functions and characteristics of each channel. While increased flows from bypass releases may result in minor increases in erosion and changes in sediment deposition, the changes are expected to be minimal and there would be no impacts on suitable yellow-breasted, yellow warbler, and song sparrow nesting habitat associated with the creeks. No potential western yellow-billed cuckoo habitat is associated with Stone Corral or Funks Creeks.

CEQA Significance Determination and Mitigation Measures

Construction and operation of Alternative 1 or 3 would have no impact on western yellow-billed cuckoo. Construction of Alternative 1 or 3 would result in significant impacts on yellow-breasted chat, yellow warbler, and song sparrow from removal of modeled habitat and potential loss or disturbance of active nests. Operation of Alternatives 1 and 3 may result in disturbance of yellow-breasted chat, yellow warbler, song sparrow if nesting or foraging at or near recreation areas. Construction impacts would be significant because Alternative 1 or 3 could reduce the local yellow-breasted chat, yellow warbler, and song sparrow populations through direct mortality and habitat loss. Yellow-breasted chat populations have declined in the Sacramento Valley as a result of riparian habitat loss and nest parasitism (Shuford and Gardali 2008:353–355). Yellow warblers are nearly extirpated in the Central Valley, primarily from loss of riparian habitat and from predation (Shuford and Gardali 2008:333). The substantial loss of wetlands and riparian forests in the Central Valley is thought to have greatly reduced the overall numbers of song sparrow and resulted in local extirpation within its range (Shuford and Gardali 2008:401).

Implementation of Mitigation Measures WILD-1.21, WILD-1.22, VEG-2.2, VEG-3.2, and VEG-3.3 would reduce the level of impact to less than significant because vegetation would be removed during the nonbreeding season, preconstruction surveys for nesting birds would be conducted, no-disturbance buffers would be established around active nest sites, and impacts on sensitive natural communities in which yellow-breasted chat, yellow warbler, and song sparrow may nest or forage would be compensated for through habitat restoration.

Mitigation Measure WILD-1.21: Conduct Vegetation Removal during the Non-Breeding Season of Nesting Migratory Birds

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.22: Conduct Preconstruction Surveys for Nesting Migratory Birds and Implement Protective Measures if Found

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.3: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters

This measure is described in Chapter 9, Section 9.4.

NEPA Conclusion

Construction of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 1 or 3 would have no adverse effect on western yellow-billed cuckoo. Construction of Alternative 1 or 3 would result in a substantial adverse effect on yellow-breasted chat, yellow warbler, and song sparrow. With implementation of Mitigation Measures WILD-1.21, WILD-1.22, VEG-2.2, VEG-3.2, and VEG-3.3, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on western yellow-billed cuckoo, yellow-breasted chat, yellow warbler, or song sparrow.

Alternative 2

Modeled habitat for yellow-breasted chat, yellow warbler, and song sparrow is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East/Funks pipelines, TRR West, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and Sacramento River discharge. Modeled habit for song sparrow is present at Funks Reservoir. Potential habitat is also present for all four bird species along the Sacramento River in the operations study area.

Construction

Alternative 2 would not result in any construction impacts on potential western yellow-billed cuckoo habitat. Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for yellow-breasted chat, yellow warbler, and song sparrow (Table 10-2d) and potential destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Impacts would be similar to those for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge under Alternative 2 would result in additional loss of suitable yellow-breasted chat, yellow warbler, and song sparrow habitat and permanent impacts on modeled habitat would be less under Alternative 2 because the inundation area would be smaller. Additional removal of potential habitat would also result in an increased potential for injury or mortality of eggs or individuals.

Operation

Potential impacts on yellow-breasted chat, yellow warbler, and song sparrow nesting and foraging activities from operation would be the same under Alternative 2 as described for Alternatives 1 and 3. Operation under Alternative 2 would have no impact on western yellow-billed cuckoo.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would have no adverse effect on western yellow-billed cuckoo. Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge would result in additional permanent loss of suitable yellow-breasted chat, yellow warbler, and song sparrow habitat, and the smaller reservoir footprint would reduce the amount of permanent habitat loss under Alternative 2. A net increase in the amount of modeled habitat removed would also increase the potential for destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Operation of Alternative 2 would result in the same impacts as those described for Alternatives 1 and 3. These impacts would be significant because Alternative 2 could reduce the local yellow-breasted chat, yellow warbler, and song sparrow populations through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.21, WILD-1.22, VEG-2.2, VEG 3.2, and VEG-3.3 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on these species. With implementation of Mitigation Measures WILD-1.21, WILD-1.22, VEG-2.2, VEG-3.2, and VEG-3.3, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on western yellow-billed cuckoo, yellow-breasted chat, yellow warbler, or song sparrow.

Impact WILD-1o: Bank Swallow

Alternatives 1 and 3

Modeled foraging habitat for bank swallow is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East Reservoir, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake and Dunnigan Pipeline. Potential bank swallow nesting habitat is present along the Sacramento River in the operations study area.

Construction

Construction of facilities under Alternatives 1 and 3 would result in the permanent and temporary losses of foraging habitat for bank swallow (Table 10-2d). Habitat loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation.

Noise and vibration from operation of vehicles and equipment, and presence of construction crews could result in temporary disturbance of bank swallow foraging activities. Rock quarries and batch plants in the inundation area and dam and dike footprints, drill and blast activities for tunneling at the I/O Works site, and CIDH pile drilling for the bridge would result in additional temporary disturbance from noise and vibration in those areas.

Operation

Impacts from maintenance activities required for operation under Alternative 1 or 3 are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. Noise and other disturbances from maintenance are not anticipated to affect foraging bank swallows.

Modeled foraging habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. Increased noise and activity in developed and undeveloped areas could cause bank swallow to avoid foraging in recreation areas or in suitable habitat near the reservoir.

The decrease in monthly average flow in the Sacramento River because of diversion would be approximately 2% under Alternative 1 or 3. The effects of the decreased flows on the geomorphic regime and geomorphic characteristics of the river are expected to be minimal. The overall volume of water and drainage pattern in the Sacramento River (and the downstream Yolo Bypass and Delta) would be similar to existing conditions. The minor changes that would result from diversions from the Sacramento River would not affect bank swallow nesting habitat along the river or downstream waterways.

CEQA Significance Determination and Mitigation Measures

Construction of Alternatives 1 and 3 could result in significant impacts on bank swallow from removal of suitable foraging habitat. Operation of Alternative 1 or 3 could result in disturbance of bank swallow foraging activities from human generated noise and disturbance at recreation areas and near the reservoir. Construction impacts would be significant because Alternative 1 or 3 could affect the local bank swallow population through loss of foraging habitat. Monitoring of the bank swallow population along the Sacramento River showed a 39% reduction in the number of burrows (nests) between 1986 and 2012 (Bank Swallow Technical Advisory Committee 2013:1). Implementation of Mitigation Measures VEG-2.2, VEG-3.2, and VEG-3.3 would reduce the level of impact for construction and operation to less than significant because impacts on sensitive natural communities in which bank swallow may forage would be compensated for through habitat restoration.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.3: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters

This measure is described in Chapter 9, Section 9.4.

NEPA Conclusion

Construction of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 1 or 3 would result in a substantial adverse effect on bank swallow. With implementation of Mitigation Measures VEG-2.2, VEG-3.2, and VEG-3.3, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on bank swallow.

Alternative 2

Modeled habitat for bank swallow is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and the Sacramento River discharge. Potential bank swallow nesting habitat is present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled foraging habitat for bank swallow (Table 10-2d). Impacts would be similar to those described for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge under Alternative 2 would result in additional loss of suitable habitat and permanent impacts on potential habitat would be less under Alternative 2 because the inundation area would be smaller.

Operation

Potential effects on bank swallow from operation would be the same under Alternative 2 as described for Alternatives 1 and 3.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge would result in additional permanent loss of foraging habitat, and the smaller reservoir footprint would reduce the amount of permanent habitat loss under Alternative 2. Operation of Alternative 2 would result in the same impacts as those described above for Alternatives 1 and 3 and there would be no adverse effect on bank swallow. Construction impacts would be significant because Alternative 2 could affect the local bank swallow population through loss of foraging habitat. Implementation of Mitigation Measures VEG-2.2, VEG 3.2, and VEG-3.3 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on bank swallow. With implementation of Mitigation Measures VEG-2.2, VEG-3.2, and VEG-3.3, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on bank swallow.

Impact WILD-1p: Tricolored Blackbird

Alternatives 1 and 3

Modeled habitat for tricolored blackbird is present at the GCID Canal diversion, GCID Main Canal improvements, TRR East Reservoir, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline.

Construction

Construction of Alternatives 1 and 3 would result in the permanent and temporary losses of nesting and foraging habitats for tricolored blackbird (Table 10-2d). Habitat loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation. Clearing and grubbing, excavation, and other construction activities could result in destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings.

Nighttime construction lighting could temporarily disturb active nest sites if they are in the illuminated area. Noise and vibration from operation of vehicles and equipment, and presence of construction crews could result in temporary disturbance of active tricolored blackbird nests and foraging activities. Rock quarries and batch plants in the inundation area and dam and dike footprints, drill and blast activities for tunneling at the I/O Works site, and CIDH pile drilling for the bridge would result in additional temporary disturbance from noise and vibration in those areas.

Operation

Impacts from maintenance activities required for operation under Alternative 1 or 3 are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. Suitable tricolored blackbird nesting habitat is not anticipated to be located near facilities that would be maintained, and noise and other disturbances from maintenance are not anticipated to affect tricolored blackbird nesting or foraging activities.

There is no modeled breeding habitat at the recreation areas. There are a few areas of modeled breeding habitat (freshwater marsh) along the perimeter of the reservoir footprint. These areas could be occasionally disturbed by people visiting the reservoir, but potential disturbance is expected to be minimal and would not result in impacts on tricolored blackbird, if nesting in the immediate vicinity. Increased noise and activity in developed and undeveloped areas would cause tricolored blackbird to avoid foraging or nesting in the recreation areas or in suitable habitat near the reservoir.

Safety nighttime lighting that would be installed at the TRR East Reservoir, Funks Reservoir, Sites Reservoir, bridge, dams, and CBD outlet have the potential to deter tricolored blackbirds from nesting in areas that are illuminated by these new sources of light. A BMP would be implemented to reduce operation impacts on nest sites by directing new facility lighting to reduce light spill and glare in surrounding areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternatives 1 and 3 could result in significant impacts on tricolored blackbird from removal of suitable habitat and potential loss or disturbance of active nests. Operation of Alternative 1 or 3 is not anticipated to result in impacts on tricolored blackbird because there is no modeled breeding habitat at recreation areas and limited modeled breeding habitat is present along the reservoir perimeter. Construction impacts would be significant because they could reduce the local tricolored blackbird population through direct mortality and habitat loss. Urban development, agricultural conversion, and harvesting of silage fields have caused a dramatic decline in the tricolored blackbird population from loss of suitable breeding and foraging habitats and loss of reproductive breeding efforts (U.S. Fish and Wildlife Service 2019:14, 28, 36–37). Implementation of Mitigation Measures WILD-1.21, WILD-1.22, VEG-2.2, VEG-3.2, and VEG-3.3 would reduce the level of impact to less than significant because vegetation would be removed during the nonbreeding season, surveys would be conducted to determine if tricolored blackbird is nesting in or near work areas, no-disturbance buffers would be established around active nest sites, and impacts on sensitive natural communities in which tricolored blackbird may nest or forage would be compensated for through habitat restoration and preservation.

Mitigation Measure WILD-1.21: Conduct Vegetation Removal during the Non-Breeding Season of Nesting Migratory Birds

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.22: Conduct Preconstruction Surveys for Nesting Migratory Birds

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.3: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters

This measure is described in Chapter 9, Section 9.4.

NEPA Conclusion

Construction of Alternatives 1 and 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternatives 1 and 3 would result in a substantial adverse effect on tricolored blackbird. With implementation of Mitigation Measures WILD-1.21, WILD-1.22, VEG-2.2, VEG-3.2, and VEG-3.3, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 is not anticipated to result in effects on tricolored blackbird.

Alternative 2

Modeled habitat for tricolored blackbird is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, Dunnigan Pipeline, TC Canal intake, and Sacramento River discharge.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of potential habitat for tricolored blackbird (Table 10-2d) and potential destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Impacts under Alternative 2 would be similar to those described for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge under Alternative 2 would result in additional loss of modeled habitat and permanent impacts on modeled habitat would be less under Alternative 2 because the inundation area would be smaller. Additional

removal of potential habitat would result in an increased potential for injury or mortality of eggs or individuals.

Operation

Potential effects on tricolored blackbird from operation would be the same under Alternative 2 as described for Alternative 1 or 3.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge would result in additional permanent loss of habitat, and the smaller reservoir footprint would reduce the amount of permanent habitat loss under Alternative 2. A net increase in the amount of habitat removed would also increase the potential for destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Operation of Alternative 2 would result in the same impacts as those described above for Alternative 1 or 3. Impacts from construction would be significant because they could reduce the local tricolored blackbird population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.21, WILD-1.22, VEG-2.2, VEG 3.2, and VEG-3.3 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on tricolored blackbird. With implementation of Mitigation Measures WILD-1.21, WILD-1.22, VEG-2.2, VEG-3.2, and VEG-3.3, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on tricolored blackbird.

Mammals

Permanent and temporary impacts on modeled habitat for special-status mammals from Alternatives 1, 2, and 3 are shown in Table 10-2e.

Table 10-2e. Acreages of Permanent and Temporary Impacts on Modeled Habitat for Special-Status Mammals in the Study Area

	Alternatives 1 and 3 Permanent Impacts	Alternatives 1 and 3 Temporary Impacts	Alternative 2 Permanent Impacts	Alternative 2 Temporary Impacts
Pallid Bat and Long-eared Myotis	15,879	1,441	15,256	1,492
Townsend's Big-eared Bat and Silver-haired Bat	15,879	1,441	15,356	1,492

Western Red Bat and Hoary Bat	15,878	1,440	15,357	1,492
American Badger	14,171	984	13,733	940

Impact WILD-1q: Pallid Bat, Townsend's Big-eared Bat, Silver-haired Bat, Western Red Bat, Hoary Bat, Long-eared Myotis and Colonies of Non-special-status Roosting Bats

Alternatives 1 and 3

Modeled habitat for pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), silver-haired bat (*Lasionycteris noctivagans*), western red bat (*Lasiurus blossevillii*), hoary bat (*Lasiurus cinereus*), long-eared myotis (*Myotis evotis*), and colonies of non-special-status roosting bats (referred to as special-status bats herein) is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East Reservoir, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline. Potential habitat is also present along the Sacramento River in the operations study area.

Construction

Construction of Alternatives 1 and 3 would result in the permanent and temporary losses of modeled habitat for special-status bats (Table 10-2e). Habitat loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation. Clearing and grubbing, excavation, and other construction activities could result in destruction of roost or roost abandonment, which could cause injury or mortality of individuals, including non-volant (i.e., non-flying) pups.

Removal of existing human-made structures and trees during construction could result in the permanent loss of roosting habitat for bats, including maternity, seasonal migration, and/or winter roosting habitats. Tree and structure removal during construction could also result in injury or mortality of bats, including non-volant pups, or eviction from roosts during the daytime when they would be disoriented and vulnerable to predation. Bats displaced from roost sites would have to compete with other bats for new roost locations.

Nighttime construction lighting could temporarily disturb bat foraging activities. Noise and vibration from operation of vehicles and equipment, and presence of construction crews could result in temporary disturbance of bats roosting near work areas. Rock quarries and batch plants in the inundation area and dam and dike footprints, drill and blast activities for tunneling at the I/O Works site, and CIDH pile drilling for the bridge would result in additional temporary disturbance of roosting bats from noise and vibration in those areas.

Operation

Impacts from maintenance activities required for operation under Alternative 1 or 3 are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. Noise and vibration from vehicles and equipment, and presence of maintenance crews could disturb individuals if maintenance activities are near active roosts. These types of disturbances would be temporary and short term and are not anticipated to adversely affect special-status bats.

Modeled habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. Although most of the activity would be in the developed areas, there is potential for visitors to access undeveloped areas, which could increase proximity of visitors to roosting bats and disturb existing habitat. In addition, increased noise and activity in developed and undeveloped areas may cause bats to avoid foraging or roosting in the recreation areas or in suitable habitat near the reservoir. While these activities may disturb bats, they would not result in injury or mortality of individuals.

Safety nighttime lighting would be installed at the TRR East Reservoir, Funks Reservoir, Sites Reservoir, bridge, dams, recreation areas, TC Canal intake, and CBD outlet. New lighting could deter bats from using areas that are illuminated by these new sources of light, but lighting may also attract insects and increase foraging opportunities around the lights. A BMP for permanent lighting specifies that safety lighting would be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on special-status bats.

The completed reservoir would provide a new drinking water source and foraging habitat for bats. This would be a beneficial effect of the Project.

The decrease in monthly average flow in the Sacramento River because of diversion would be approximately 2% under Alternative 1 or 3. The effects of the decreased flows on the geomorphic regime and geomorphic characteristics of the river are expected to be minimal. The overall volume of water and drainage pattern in the Sacramento River (and the downstream Yolo Bypass and Delta) would be similar to existing conditions. The minor changes that would result from diversions from the Sacramento River would not affect trees that may provide roosting habitat for special-status bats along the river or downstream waterways.

Stone Corral and Funks Creeks would have increased flows that would range from 0 to 100 cfs, with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). These flow increases would support the existing geomorphic functions and characteristics of each channel. While increased flows from bypass releases may result in minor increases in erosion and changes in sediment deposition, the changes are expected to be minimal and there would be no impacts on roosting habitat for special-status bats associated with the creeks.

CEQA Significance Determination and Mitigation Measures

Implementation of Alternative 1 or 3 would have the beneficial effects of providing a new drinking water source and foraging habitat for bats. Construction of Alternatives 1 and 3 would result in significant impacts on special-status bats from removal of suitable habitat and potential loss or disturbance of active roosts and displacement of bats from roost sites. Operation of Alternative 1 or 3 may result in disturbance of roosting or foraging bats but are not anticipated to result in injury or mortality or destruction of habitat. This impact would be less than significant. Impacts from construction would be significant because they could reduce the local populations of these special-status bats through direct mortality and habitat loss. Many bat species are rare, declining, or have unknown population sizes. Historical and ongoing challenges of bats include habitat loss, alteration, and disturbance; and new challenges include wind energy, climate change, and emerging diseases such as white-nose syndrome (U.S. Geological Survey n.d.). Implementation of Mitigation Measures WILD-1.30, WILD-1.31, WILD-1.32, VEG-2.2, VEG-3.2, VEG-4.1, and VEG-4.2 would reduce the level of impact to less than significant because surveys for special-status bats would be conducted, protective measures would be implemented, roosting habitat that is permanently lost would be replaced and protected onsite or at an offsite preservation area, impacts on oak woodland would be minimized, and impacts on sensitive natural communities in which special-status bats may roost or forage would be compensated for through habitat restoration and preservation.

Mitigation Measure WILD-1.30: Conduct Surveys and Implement Protection Measures for Special-Status Bat Species Prior to Building/Structure Demolition

Prior to building/structure demolition, the Authority will employ a qualified biologist (defined below) to conduct preconstruction surveys and implement protective measures for pallid bat, Townsend's big-eared bat, silver-haired bat, long-eared myotis, and other bats that roost in or on buildings and structures. At least 2 months prior to the demolition of the existing buildings and structures, qualified biologists will conduct an initial daytime survey to assess the buildings/structures for potential bat roosting habitat, and to look for bats and bat sign. The qualified biologists will have knowledge of the natural history of the species that may be present, have sufficient experience determining bat occupancy, and be familiar with bat survey techniques. The qualified biologist will examine both the inside and outside of the buildings/structures for potential roosting habitat, as well as routes of entry to the building and structures. Locations of any roosting bats, signs of bat use, and entry and exit points will be noted and mapped on a drawing of the buildings and structures. Roost sites will also be photographed as feasible. Depending on the results of the habitat assessment, the Authority will ensure the following steps will be taken:

- If the building and structures can be adequately assessed (i.e., sufficient areas of the buildings and structures can be examined) and no habitat or limited potential habitat for roosting bats is present and no signs of bat use are present, another survey of the

interior and exterior of the buildings/structures will be conducted by a qualified biologist within 24 hours of demolition.

- If moderate or high potential habitat for roosting bats is present but there are no signs of bat use, measures will be implemented under the guidance of the qualified biologists to exclude bats from using the buildings and structures as a roost site to the extent feasible given the conditions of the structures, such as sealing off entry points. Prior to installing exclusion measures, the qualified biologists will re-survey the buildings and structures to ensure that no bats are present. In addition, a preconstruction survey of the interior and exterior of the buildings and structures will be conducted within 24 hours of demolition to confirm that no bats are present.

If moderate or high potential habitat is present and bats or bat sign are observed, exclusion measures are not installed as described above, or the buildings or structures provide suitable habitat but cannot be adequately assessed, the Authority will implement the following protective measures:

- Prior to initiating demolition activities, follow-up surveys will be conducted to determine if bats are present. If CDFW requests that species be identified, a survey plan will be developed (number, timing, and type of surveys) by the qualified biologists and surveys using night vision goggles and active acoustic monitoring using full spectrum bat detectors will be conducted.
- The qualified biologist will develop a plan to discourage or exclude bat use of buildings/structures prior to demolition based on the timing of demolition, extent of bat sign or occupied habitat, and species present (if determined). The plan may include installing exclusion measures or using light or other means to deter bats from using the buildings and structures to roost. The plan will be submitted to CDFW for review and approval.
- A preconstruction survey of the interior and exterior of the building and structures will be conducted within 24 hours of demolition to confirm that no bats are present.

Depending on the species of bats present, size of the bat roost, and timing of the demolition, the Authority will implement the following additional protective measures as applicable:

- To avoid impacts on maternity colonies and/or hibernating bats, buildings/structures where bats are confirmed to be present will not be demolished during the maternity season (generally between April 1 and September 15) or the hibernation season (generally from November 1 to March 1). Removal of occupied roosting habitat will be conducted only following the maternity season and prior to hibernation, generally between September 15 and October 31, unless exclusionary devices are first installed. Other measures, such as using lights to deter bat roosting, may be used as developed by the qualified biologist and as approved by CDFW, if applicable.

- Installation of exclusion devices will be conducted only before maternity colonies establish (generally from March 1 to March 31) or after they disperse (generally September 15 to October 31) to prevent bats from occupying a roost site during demolition to the extent feasible. Exclusionary devices will be installed by or under the supervision of a qualified biologist.

Mitigation Measure WILD-1.31: Conduct Surveys and Implement Protection Measures for Special-Status Bat Species Prior to Tree Trimming and Removal

Prior to tree trimming or removal, the Authority will employ a qualified biologist to conduct pre-construction surveys and implement protective measures for pallid bat, Townsend's big-eared bat, silver-haired bat, western red bat, hoary bat, long-eared myotis, and other tree-roosting bats. Prior to initiating tree trimming or removal, a qualified biologist will examine the trees to be removed or trimmed to identify suitable bat roosting habitat. Because of the limited timeframe for tree removal (September 15 to October 31), the tree habitat assessment should be conducted early enough to provide information to inform tree removal planning. The biologists will identify high-quality habitat features (e.g., large tree cavities, basal hollows, loose or peeling bark, larger snags), and the area around these features will be searched for bats and bat sign. If the tree can be adequately assessed and no habitat for roosting bats is present, no further actions are necessary and tree removal or trimming may commence. Because signs of bat use are not easily found, and trees cannot be completely surveyed for bat roosts, the Authority will implement the following protective measures listed below for trees containing potential roosting habitat.

- Trimming or removal of trees with potentially suitable bat roosting habitat will be avoided during the maternity season (generally between April 1 and September 15) and the hibernation season (generally from November 1 to March 1).
- Removal of trees providing bat roosting habitat will be conducted only before maternity colonies establish (generally from March 1 to March 31) or after they disperse (generally September 15 to October 31).
- If a maternity roost is found, the roost will be protected until September 15 or until the qualified biologist has determined the roost is no longer active. Appropriate no-work buffers around the roost will be established under direction of the qualified biologist. Buffer distances may vary depending on the species and activities being conducted.
- Trimming and removal of trees (between September 15 and October 31) with suitable roosting habitat will be monitored by a qualified biologist. Tree trimming and removal will be conducted using a two-phase removal process conducted over two consecutive days. In the afternoon on the first day, limbs and branches will be removed using chainsaws only. Only branches or limbs without cavities, crevices, or deep bark fissures will be removed; branches and limbs with these features will be avoided. On the second day, the entire tree will be removed. The qualified biologist

will search through downed vegetation for injured or dead bats. Observation of injured or dead special-status bats will be reported to CDFW.

Mitigation Measure WILD-1.32: Compensate for Permanent Impacts on Occupied Roosting Habitat

The Authority will compensate for the permanent loss of occupied roosting habitat by constructing and/or installing suitable replacement habitat onsite or at an offsite preservation area. The roosting habitat design will be developed in coordination with and approved by CDFW. A monitoring plan will be prepared to ensure the replacement habitat is maintained and functions as intended. Annual reports will be submitted to CDFW to document compliance with monitoring requirements.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-4.1: Avoid and Minimize Potential Adverse Effects on Oak Woodlands During Construction

This measure is described in Chapter 9, Section 9.4.

Mitigation Measure VEG-4.2: Compensate for Adverse Effects on Oak Woodlands

This measure is described in Chapter 9, Section 9.4.

NEPA Conclusion

Construction of Alternatives 1 and 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternatives 1 and 3 would result in a substantial adverse effect on special-status bats. With implementation of Mitigation Measures WILD-1.30, WILD-1.31, WILD-1.32, VEG-2.2, VEG-3.2, VEG-4.1, and VEG-4.2, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on special-status bats.

Alternative 2

Modeled habitat for special-status bats is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East, TRR/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, Dunnigan Pipeline, TC Canal intake, and the Sacramento River discharge. Potential habitat is also present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for special-status bats (Table 10-2e) and potential destruction of roosts or roost abandonment, which could cause injury or mortality of individuals or non-volant pups. Impacts would be similar to those described for Alternatives 1 and 3 except that construction of South Road, TRR West, and Sacramento River discharge under Alternative 2 would result in additional loss of modeled habitat and permanent impacts on modeled habitat would be less under Alternative 2 because the inundation area would be smaller. Additional removal of habitat would also result in an increased potential for injury or mortality of individuals.

Operation

Potential effects on special-status bats from operation would be the same under Alternative 2 as described for Alternative 1 or 3.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge would result in additional permanent loss of suitable habitat, and the smaller reservoir footprint would reduce the amount of permanent habitat loss under Alternative 2. A net increase in the amount of suitable habitat removed would also increase the potential for destruction of roosts or roost abandonment, which could cause injury or mortality of individuals, including non-volant pups. These impacts would be significant because Alternative 2 could reduce the local special-status bat populations through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.30, WILD-1.31, WILD-1.32, VEG-2.2, VEG-3.2, VEG-4.1, and VEG-4.2, would reduce the level of impact to less than significant. Operation under Alternative 2 would be the same as for Alternatives 1 and 3.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on special-status bats. With implementation of Mitigation Measures WILD-1.30, WILD-1.31, WILD-1.32, VEG-2.2, VEG-3.2, VEG-4.1, and VEG-4.2, effects would be reduced to no adverse effect. Operation of Alternative 2 would result

in the same effects as those described above for CEQA, and there would be no adverse effect on special-status bats.

Impact WILD-1r: American Badger

Alternatives 1 and 3

Modeled habitat for American badger is present at the GCID Main Canal improvements, TRR East, TRR East/Funks pipelines, Funks Reservoir, inundation area, dams, I/O Works, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline.

Construction

Construction of Alternatives 1 and 3 would result in the permanent and temporary losses of modeled habitat for American badger (Table 10-2e). Habitat loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation. Clearing and grubbing, excavation, and other construction activities could result in the destruction of dens and mortality or injury of individuals from being crushed or buried by equipment. American badger could also be struck by vehicles and equipment traveling along access roads during construction.

Construction activities, including ongoing human presence in the inundation area, and roadway use, could result in disruption of breeding or foraging activities or other movements in individuals' home ranges. Noise and vibration created during operation of vehicles, equipment, and construction crews could result also in temporary disruption of foraging or breeding behaviors or alteration of movement patterns. Rock quarries and batch plants in the inundation area and dam and dikes footprints, drill and blast activities for tunneling at the I/O Works site, and CIDH pile drilling for the bridge would result in additional temporary disturbance from noise and vibration in those areas.

Operation

Impacts from maintenance activities required for operation under Alternative 1 or 3 are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. American badgers are not anticipated to den near facilities that would be maintained, as they infrequently occupy developed areas (Williams 1986:66; Lay 2008:4), and noise and other disturbances from maintenance are not anticipated to affect denning American badgers. Use of rodenticides at the facilities could cause illness or mortality of American badger because they could feed on rodents that have ingested rodenticide.

New roadways could impede movement and increase the potential for American badger to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas. Fencing along roadways could cause individuals to become trapped on roadways, resulting in additional risk of vehicle strikes. The presence of Sites Reservoir would also impede movement of American badger.

The recreation areas and reservoir would be used by a visitors on a regular basis, which would result in an increased human presence and noise in these areas. Although most of the activity would be in the developed areas, there is potential for visitors to access undeveloped areas, which could increase proximity of visitors to potential dens and disturb existing habitat. In addition, increased noise and activity in developed and undeveloped areas could cause American badger to avoid foraging or denning in the recreation areas or in suitable habitat near the reservoir.

Safety nighttime lighting would be installed at the TRR East, Funks Reservoir, Sites Reservoir, bridge, dams, recreation areas, TC Canal intake, and CBD outlet. Lighting could deter American badger from denning in areas and may affect foraging movements. A BMP for permanent lighting specifies that safety lighting would be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on American badger.

CEQA Significance Determination and Mitigation Measures

Construction of Alternatives 1 and 3 would result in significant impacts on American badger from removal of suitable habitat and potential loss or disturbance of active dens. Operation of Alternative 1 or 3 may result in disturbance of American badger if denning at or near recreation areas, and the use of rodenticides could cause illness, injury, or morality of individuals if rodenticides are ingested. These impacts would be significant because Alternative 1 or 3 could reduce the local American badger population through direct mortality and habitat loss. American badger was once common in California, but the population was reduced by as much as 90% in the early 1900s from trapping. Although the current population numbers are not known, this species is now considered uncommon and is threatened by habitat loss and fragmentation, vehicle strikes, trapping, predation, and depredation, including ingestion of rodenticide (Quinn 2008:108–109). Implementation of Mitigation Measures WILD-1.25, WILD-1.33, and VEG-2.2 would reduce the level of impact to less than significant because surveys would be conducted to determine if suitable or occupied dens are present in or near work areas, no-disturbance buffers would be established around active den sites, and impacts on sensitive natural communities in which American badger may den or forage would be compensated for through offsite habitat restoration and preservation.

Mitigation Measure WILD-1.25: Protect Special-status Wildlife from Rodenticide Use

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.33: Implement Protective Measures to Avoid and Minimize Potential Impacts on American Badger

Where suitable habitat is present for American badger in and within 200 feet of work areas where ground disturbance will occur, the Authority will implement the following protective measures.

- The authority will retain qualified biologists (experienced with the identification of suitable badger dens) to conduct a preconstruction survey for active badger dens prior to temporary or permanent ground disturbance. The preconstruction survey will be conducted no less than 14 days and no more than 30 days before the beginning of ground disturbance. The biologists will conduct den searches by systematically walking transects through the area to be disturbed and a 200-foot buffer area. Transect distance should be based on the height of vegetation such that 100% visual coverage of the disturbance area is achieved. If a suitable or occupied den is found during the survey, the biologist will record the den dimensions, the shape of the den entrance, presence of tracks, scat, or prey remains, den occupancy (i.e., suitable, potentially occupied, or occupied), recent excavations at the den site, and the den location.
- To the maximum extent feasible, disturbance or destruction of suitable dens for American badger in temporarily impact areas will be avoided.
- Any occupied or potentially occupied American badger den will be avoided by establishing an exclusion zone 100 feet from the den entrance. If the den cannot be avoided, the Authority will contact CDFW for direction on additional steps to be taken.
- Unoccupied suitable dens that would be destroyed by construction may be removed by hand excavation by a biologist or under the supervision of a biologist; a mini excavator may be used to facilitate excavation of dens.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.4.

NEPA Conclusion

Construction of Alternatives 1 and 3 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternatives 1 and 3 would result in a substantial adverse effect on American badger. With implementation of Mitigation Measures WILD-1.25, WILD-1.33, and VEG-2.2, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and there would be no adverse effect on American badger.

Alternative 2

Modeled habitat for American badger is present at the GCID Main Canal improvements, TRR, TRR/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for American badger (Table 10-2e) and potential destruction of dens or den abandonment, which could cause injury or mortality of individuals. Impacts under Alternative 2 would similar to those described for Alternatives 1 and 3 except that construction of the new South Road and TRR West under Alternative 2 would result in additional loss of potential habitat and permanent impacts on potential habitat would be less under Alternative 2 because the inundation area would be smaller. Additional removal of potential habitat would also result in an increased potential for destruction of dens, which could cause injury or mortality of individuals.

Operation

Potential effects on American badger from operation would be similar under Alternative 2 as described for Alternative 1 or 3. Under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Because additional roadway would be constructed under Alternative 2, the greater amount of roadway would impede movement over a larger area and increase the potential for American badger to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that construction of South Road and TRR West would result in additional permanent loss of suitable habitat, and the smaller reservoir footprint would reduce the amount of permanent habitat loss under Alternative 2. A net increase in the amount of suitable habitat removed would also increase the potential for destruction of dens or den abandonment, which could cause injury or mortality of individuals. Operation impacts under Alternative 2 would be similar to those under Alternative 1 or 3 except that the increased amount of roadway would impede movement over a larger area. These impacts would be significant because Alternative 2 could reduce the local American badger population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.25, WILD-1.33, and VEG-2.2 would reduce the level of impact to less than significant.

NEPA Conclusion

Construction of Alternative 2 would result in the same effects as those described above for CEQA, and the same mitigation measures would be implemented. Construction of Alternative 2 would result in a substantial adverse effect on American badger. With implementation of Mitigation Measures WILD-1.25, WILD-1.33, and VEG-2.2, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and there would be no adverse effect on American badger.

Impact WILD-2: Substantial interference with the movement of a native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impediment of the use of native wildlife nursery sites

Suitable habitat is required for wildlife species to provide food, water, cover, and other elements for survival. Depending on the species, a variety of habitats may be used throughout the life cycle, including reproduction and dispersal. Local movement, migration, and dispersal patterns vary for different species, and may be an important part of individual and species survival. In California, development, including agriculture, urbanization, and transportation, has resulted in substantial habitat reduction and fragmentation that presents barriers to local movements and migration for many wildlife species. Development has also resulted in additional risk to wildlife when moving through these areas, including risk of vehicle strikes on roadways.

CDFW and the California Department of Transportation have identified existing habitat blocks and linkages within the state, as well as missing linkages, and developed strategies for preserving and enhancing wildlife linkages through the California Essential Habitat Connectivity Project (Spencer et al. 2010). Mapped natural landscape blocks are large areas of mostly intact and well-conserved natural areas, and essential connectivity areas are connections between these blocks that have been identified as high priority for maintaining and enhancing ecological connectivity. In the Central Valley region, the essential connectivity areas often connect existing reserves across lands with more roads, agriculture, and urbanization, which can constrain wildlife movements. According to California Essential Habitat Connectivity Project mapping, there are multiple natural landscape blocks, essential connectivity areas, small natural areas, core reserves and corridors, potential riparian linkages, and missing linkages in the study area.

Much of the study area is comprised of natural and agricultural land covers, and there is very little existing urban development to block wildlife movement except for roadways and irrigation infrastructure. As discussed under Impact WILD-1, there is potential habitat for multiple special-status species, including suitable habitats for foraging, reproduction, migration, and dispersal, in the areas affected by Project components. In addition, there is potential for non-listed wildlife to be in these areas, including deer, tule elk, mountain lions (*Puma concolor*), bobcats, foxes, raccoons, skunks, squirrels, raptors, birds, reptiles, and amphibians. These species may use the area for foraging, cover, breeding, and migration.

No Project

Under the No Project Alternative, new Project facilities would not be constructed or operated and there would be no temporary or permanent impacts on wildlife movement, wildlife corridors, or use of wildlife nursery sites.

Significance Determination

The No Project Alternative would not substantially interfere with the movement of a native resident or migratory wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. There would be no impact.

Alternatives 1 and 3

Construction

As discussed under Impact WILD-1, construction of Alternatives 1 and 3 would result in the permanent and temporary losses of modeled habitat for special-status wildlife species, including breeding, foraging, migration, and dispersal habitats. Some of this habitat loss would be within existing natural landscape blocks and essential connectivity areas identified in the California Essential Habitat Connectivity Project mapping. Construction noise and activities and nighttime lighting could result in temporary disruption of wildlife movement by creating barriers or impediments to movement. Wildlife may adjust their typical foraging, migration and/or dispersal movements to avoid construction areas. These adjustments could result in increased energy expenditure or exposure to predation.

Temporary and permanent habitat loss would reduce availability or access to breeding/nursery sites in the study area, including breeding sites for aquatic invertebrates and amphibians, upland burrow and den sites for reptiles, raptors, and mammals, nesting sites for birds and raptors, and roosting sites for mammals. Construction activities, noise, vibration, and increased human presence could also cause wildlife to avoid existing breeding/nursery sites, impeding the use of these areas.

Operation

Sites Reservoir would be a new physical barrier for wildlife movement through the study area. Because the length of the reservoir would be nearly 13 miles from north to south and up to 4 miles from west to east, wildlife moving through the area would need to travel a greater distance around the reservoir to reach the other side. The reservoir would be constructed within several existing natural landscape blocks and essential connectivity areas identified in the California Essential Habitat Connectivity Project maps. Other facilities under Alternatives 1 and 3 would also fragment existing habitat blocks and linkages used by wildlife, which could impede or prevent use of these corridors.

Maintenance activities required for operation of Alternative 1 or 3 could result in wildlife being struck by vehicles and equipment traveling along access roads during operation. The presence of new facilities, fencing, noise, and presence of humans could cause wildlife to avoid the facilities and modify their movement paths, which could result in increased energy expenditure or exposure to predation.

Recreation areas would be used by visitors on a regular basis, which would result in an increased human presence in these areas. The increased proximity of visitors to natural areas could cause wildlife to modify their movement patterns to avoid these areas. and potential for disturbance and fragmentation of remaining habitat blocks and linkages of existing habitat. In addition, increased activity could result in reduced or avoidance of these areas by wildlife for movement or breeding.

Safety nighttime lighting would be installed at the TRR East, Funks Reservoir, Sites Reservoir, bridge, dams, recreation areas, TC Canal intake, and the CBD outlet. Lighting could cause wildlife to avoid using areas illuminated by these new sources of light or modify movement pathways to avoid the lighted areas, which could result in increased energy expenditure or exposure to predation. A BMP for permanent lighting specifies that safety lighting would be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize potential impacts from new lighting on wildlife movement.

New roadways would create physical barriers or impediments for some wildlife, including amphibians and reptiles, which may have a difficult time crossing the roadways. There are numerous waterways and wetlands in the study area, and new or larger roadways could disrupt existing connections between aquatic and upland habitats, and result in increased habitat fragmentation, which could affect seasonal movements of amphibians and reptiles. Roadways may deter some larger animals from moving through those areas, even if they are able to physically cross the roadways. In addition, some of the roadways may be fenced, which would create a greater impediment to large animals attempting to cross the road. New roadways would also increase the potential for wildlife to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas, and the presence of fences could trap animals in the roadway and make them more prone to being struck by vehicles.

Maintenance activities and human activity at recreation areas could result in disturbance of active bird nests and bat roosting sites if the activities or disturbance are conducted during a sensitive period in the nesting process (e.g., when fledglings are just learning to fly) or are close to nests or roost sites. New lighting could deter birds from nesting in areas that are illuminated by these new sources of light. The BMP described above would minimize potential impacts from new lighting on nesting sites.

CEQA Significance Determination and Mitigation Measures

Construction of Alternatives 1 and 3 would create barriers to or impede wildlife movement within existing natural landscape blocks and essential connectivity areas. Fragmentation and loss of natural landscape blocks and essential connectivity areas would result in a significant impact on wildlife movement and wildlife corridors. Construction of Alternatives 1 and 3 would also result in removal or disturbance of nursery sites. Operation of Alternative 1 or 3 would result in increased human activity at facilities and recreation areas, additional vehicles on roadways, and fencing that would create barriers to or impede wildlife movement. These impediments would also result in a significant impact on wildlife movement. Implementation of Mitigation Measures discussed in Impact WILD-1 would reduce permanent and temporary construction impacts on nursery sites but they would not mitigate impacts on wildlife movement and the loss of habitat connectivity within existing habitat blocks. Implementation of Mitigation Measures WILD-2.1 and WILD-2.2 would reduce the impact on wildlife movement under operation of Alternatives 1 and 3 but it would not mitigate the substantial barrier created by Sites Reservoir. Impacts after mitigation would remain significant and unavoidable.

Mitigation Measure WILD-2.1: Design and Construct Wildlife Crossings for New Roadways at Suitable Locations

The Authority will employ a qualified wildlife biologist with expertise in wildlife crossing use and design to conduct a wildlife connectivity and crossing assessment and to determine where suitable wildlife crossing structures would be most effective along North Road, Sites Lodoga Road, and other roads as determined by the Authority and the wildlife biologist. Wildlife crossing structures will be designed and constructed at suitable locations to provide habitat connectivity and safe movement for an array of wildlife likely to use the Project area. To ensure that the assessment is inclusive of a variety of species a wildlife crossing species guild (WCG) approach will be used as detailed in Kintsch et al. 2015. This WCG approach will include ecological and behavioral needs of a variety of species inhabiting the Project area/region. Wildlife crossing locations and design will be determined based on WCG species inhabiting the Project area/region, habitat features, topography, and the future state of the Project area through a wildlife connectivity and crossing assessment.

Prior to final roadway design for the Project, a wildlife connectivity assessment will be conducted to assess existing and expected wildlife movement and habitat connectivity conditions, Project-related impact on connectivity and species movement, and identify appropriate wildlife crossing locations and designs. The assessment will include a landscape-scale and local (Project)-scale assessments. The assessment may use database research, field surveys, photo monitoring, GIS modeling, or a combination thereof to identify existing wildlife species in the Project area, determine how connectivity and species movement may be affected by the Project, and determine the appropriate locations and designs of wildlife crossings.

Wildlife crossings will be located at appropriate frequencies to accommodate a range of species expected to move through the area. For example, for small-bodied animals like amphibians, reptiles, and small mammals, where species habitat and movement needs are present, wildlife crossings may be located no more than 1,000 feet apart or as determined appropriate for specific target species. For medium- and large-bodied animals, such as bobcats, coyotes, tule elk, and deer, wildlife crossings may be located no more than 1 mile apart.

Wildlife crossings will be located where there is suitable habitat on both sides of the roadway. If feasible and depending on the size and ecological and behavioral needs of target species, vegetative cover will be provided near entrances to give animals security and reduce negative effects such lights and noise associated with the road. Suitable habitat and/or cover will also be provided in the crossing structure wherever feasible. This may be achieved by designing culverts to be high enough to allow light for plants to grow, installing rubble piles, stumps, or branches to provide cover for smaller animals in the crossings, and leaving earthen bottoms in crossing structures.

When possible, wildlife crossings will be located away from areas used or dominated by humans, including recreation areas, trails, and lighted areas to avoid reduced wildlife crossing movement function and to prevent human-wildlife conflict.

Wildlife crossings will be designed to optimally facilitate movement for multiple WCG species. When possible, proposed culverts will be designed to function as multi-use culverts, which are designed to ensure that they facilitate wildlife movement. Multi-use culvert crossings will be designed to be optimally accessible to wildlife movement and will also be designed to require minimal maintenance.

Wildlife fencing will be installed to direct wildlife towards crossings and prevent wildlife access to roadways and other areas they must be excluded from. Escape opportunities such as jump-out ramps, may be provided as appropriate in conjunction with fencing to allow animals to escape from the roadway.

Mitigation Measure WILD-2.2: Monitor and Maintain Wildlife Crossings

Because many wildlife species will avoid or be obstructed by structures with a substantial amount of debris or blockages, the Authority will employ a qualified wildlife crossing biologist to regularly monitor crossings and culverts and clear them or oversee the clearing of debris and other blockages. Vegetative cover will be maintained near entrances to provide cover and reduce negative effects such as artificial lighting and noise associated with the road. A monitoring and maintenance plan for wildlife crossings will be developed during design wildlife crossings (Mitigation Measure WILD-2.1) to document post-construction conditions, determine the frequency of monitoring and maintenance, performance standards, and reporting requirements.

NEPA Conclusion

Construction and operation of Alternatives 1 and 3 would result in the same effects as those described above for CEQA. Implementation of Mitigation Measures discussed in Impact WILD-1 would reduce permanent and temporary construction effects on nursery sites and implementation of Mitigation Measure WILD-2.1 and WILD-2.2 would reduce the effect on wildlife movement from operation but it would not mitigate the movement barrier created by Sites Reservoir. Construction and operation of Alternative 1 or 3 would result in a substantial adverse effect on wildlife movement and nursery sites.

Alternative 2

Construction

Construction of Alternative 2 would create barriers to or impede wildlife movement within existing habitat blocks and linkages and would remove or disturb nursery sites. Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3, except that Alternative 2 would include the construction of South Road, TRR West, and the Sacramento River discharge,

which would increase the extent of construction noise and activities that could disrupt or impede wildlife movement. Wildlife may adjust their typical foraging, migration and/or dispersal movements to avoid construction areas. These adjustments could result in increased energy expenditure or exposure to predation.

Operation

Operation of Alternative 2 would result in impacts similar to those for Alternative 1 or 3, except that the reservoir would be a smaller barrier to movement (yet still a barrier) and South Road would be a potential impediment to wildlife movement over a larger area and additional wildlife trying to cross a longer segment of road could be struck by vehicles.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would create barriers to or impede wildlife movement within existing natural landscape blocks and essential connectivity areas. Under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Fragmentation and loss of natural landscape blocks and essential connectivity areas would result in a significant impact on wildlife movement and wildlife corridors. Construction of Alternative 2 would also result in removal or disturbance of nursery sites. Operation of Alternative 2 would result in increased human activity at facilities and recreation areas, additional vehicles on roadways, and fencing that would create barriers to or impede wildlife movement. These impediments would also result in a significant impact on wildlife movement. Implementation of Mitigation Measures discussed in Impact WILD-1 would reduce permanent and temporary impacts on nursery sites but they would not mitigate impacts on wildlife movement and the loss of natural landscape blocks and essential connectivity areas. Implementation of Mitigation Measure WILD-2.1 and WILD-2.2 would reduce the impact on wildlife movement from Alternative 2 but it would not mitigate the substantial barrier created by Sites Reservoir. Impacts after mitigation would remain significant and unavoidable

NEPA Conclusion

Construction and operation of Alternative 2 would result in the same effects as those described above for CEQA. Implementation of Mitigation Measures discussed in Impact WILD-1 would reduce permanent and temporary effects on nursery sites and implementation of Mitigation Measure WILD-2.1 and WILD-2.2 would reduce the effect on wildlife movement but it would not mitigate the movement barrier created by Sites Reservoir. Construction and operation of Alternative 2 would result in a substantial adverse effect on wildlife movement and nursery sites.

Impact WILD-3: Conflict with any local policies or ordinances protecting wildlife resources

Local policies and ordinances protecting wildlife resources that could pertain to the Project are described in Appendix 4A, Section 4A.6.3, *Local/Regional Policies and Regulations*.

No Project

Under the No Project Alternative, new Project facilities would not be constructed or operated and there would be no temporary or permanent impacts on wildlife resources that would potentially conflict with the goals and policies of the applicable county general plans for the protection of wildlife resources.

Significance Determination

The No Project Alternative would not conflict with any local policies or ordinances protecting wildlife resources. There would be no impact.

Alternatives 1, 2, and 3

Construction

As discussed under Impacts WILD-1 and WILD-2, construction of Alternatives 1, 2 or 3 could result in impacts on wildlife resources, which are protected under the Tehama County, Glenn County, Colusa County, and/or Yolo County General Plans. In Tehama County, work at the RBPP would not result in any impacts on wildlife resources. In Glenn County, construction of the GCID Main Canal diversion and GCID Canal improvements would result in permanent and temporary impacts on special-status wildlife species and their habitats. In Colusa County, construction of the TRR East, TRR/Funks pipelines, TRR West (Alternative 2), Funks Reservoir, Sites Reservoir and related facilities, and roadways would result in permanent and temporary impacts on special-status wildlife species, their habitats, habitat linkages, and wildlife corridors. In Yolo County, construction of the Dunnigan Pipeline, TC Canal intake, CBD outlet, and the Sacramento River discharge (Alternative 2) would result in permanent and temporary impacts on special-status wildlife species and their habitats.

Operation

As discussed under Impacts WILD-1 and WILD-2, operation of Alternative 1, 2, or 3 could result in impacts on special-status wildlife species during facility maintenance. In addition, lighting would be installed at several locations that could affect foraging and breeding activities and wildlife movements. Human activity at recreation areas could result in disturbance of breeding or foraging activities and wildlife movement. The reservoir would create a physical barrier to terrestrial wildlife movement and new roadways could impede movement and result in additional vehicle strikes.

In Tehama County, operation of the RBPP would not result in any impacts on special-status wildlife species. In Glenn County, operation of the GCID Main Canal diversion and GCID Canal improvements could result in periodic impacts on special-status wildlife during maintenance activities, but these impacts would mostly be temporary and short term. In Colusa County, operation of the TRR East, TRR East/Funks pipelines, TRR West (Alternative 2), Funks Reservoir, Sites Reservoir and related facilities, and roadways would result in impacts on

special-status wildlife species, their habitats, habitat linkages, and wildlife corridors. In Yolo County, operation of the Dunnigan Pipeline, TC Canal intake, CBD outlet, and the Sacramento River discharge (Alternative 2) could cause periodic impacts related to maintenance activities but impacts from maintenance activities would mostly be temporary and short term.

The decrease in monthly average flow in the Sacramento River because of diversions would be approximately 2% under Alternative 1 or 3. The effects of the decreased flows on the geomorphic regime and geomorphic characteristics of the river are expected to be minimal. The overall volume of water and drainage pattern in the Sacramento River (and the downstream Yolo Bypass and Delta) would be similar to existing conditions. The minor changes that would result from diversions from the Sacramento River would not affect special-status wildlife and their habitats.

Stone Corral and Funks Creeks would have increased flows that would range from 0 to 100 cfs, with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). These flow increases would support the existing geomorphic functions and characteristics of each channel. While increased flows from bypass releases may result in minor increases in erosion and changes in sediment deposition, the changes are expected to be minimal and there would be no impacts on special-status wildlife or habitats associated with the creeks.

CEQA Significance Determination and Mitigation Measures

Construction and operation of Alternatives 1, 2 and 3 would conflict with policies and local ordinances protecting wildlife resources and would result in a significant impact. Implementation of mitigation measures discussed under Impacts WILD-1 and WILD-2 would require habitat assessments and focused surveys for special-status wildlife, and avoidance and minimization measures to reduce impacts on special-status wildlife and their habitats during construction and operation, replace permanently lost habitat, and reduce new impediments to wildlife movement through design, construction, monitoring, and maintenance of wildlife crossings at strategic locations. With implementation of these measures, Alternatives 1, 2, and 3 would not conflict with the goals and policies in the Tehama County, Glenn County, Colusa County, and Yolo County General Plans and impacts would be reduced to a less-than-significant level.

NEPA Conclusion

Construction and operation of Alternatives 1, 2, and 3 would result in the same effects as those described above for CEQA. Alternative 1, 2, or 3 would result in a substantial adverse effect on local policies and ordinances protecting wildlife resources but through implementation of mitigation measures, effects would be reduced to no adverse effect.

Impact WILD-4: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan

The adopted plans that pertain to the study area are Yolo County Habitat Conservation Plan/Natural Community Conservation Plan (Yolo County HCP/NCCP) (Yolo Habitat Conservancy 2018) and the Yolo Bypass Wildlife Area Land Management Plan (Yolo Bypass Wildlife Area LMP) (California Department of Fish and Game 2008). These plans are described in Appendix 4A, Section 4A.6.3, *Local/Regional Policies and Regulations*. The Project facilities in the planning areas for these plans are the Dunnigan Pipeline, TC Canal intake, and CBD outlet (Alternatives 1 and 3), and the Sacramento River discharge (Alternative 2), which are in Yolo County. The Yolo Bypass is within the operations study area.

No Project

Under the No Project Alternative, no new Project facilities would be constructed or operated and there would be no temporary or permanent impacts on wildlife resources that would potentially conflict with the provisions of an adopted or approved local, state, or regional habitat conservation plan.

Significance Determination

The No Project Alternative would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. There would be no impact.

Alternatives 1, 2, and 3

Construction

As discussed under Impacts WILD-1, WILD-2, and WILD-3, construction of the Dunnigan Pipeline, CBD outlet, and the Sacramento River discharge (Alternative 2) would result in impacts on special-status species, including valley elderberry longhorn beetle, western pond turtle, giant gartersnake, Swainson's hawk, white-tailed hawk, burrowing owl, bank swallow, and tricolored blackbird and their habitats, which are covered species in the Yolo County HCP/NCCP. There would be no construction in the Yolo Bypass area.

Operation

As discussed under Impacts WILD-1, WILD-2, and WILD-3, operation of Alternatives 1, 2, and 3 could result in impacts on special-status wildlife species during facility maintenance, including maintenance of the Dunnigan Pipeline, CBD outlet, and the Sacramento River discharge. Operational impacts associated with maintenance would mostly be temporary and short term. In addition, lighting would be installed at the TC Canal intake and the CBD outlet, which could

reduce the potential for some wildlife species to use existing habitat in these areas. Lighting overspill would be minimized through BMPs.

The decrease in monthly average flow in the Sacramento River because of diversions would be approximately 2% under Alternative 1 or 3 and from less than 1% to less than 2% under Alternative 2. The effects of the decreased flows on the geomorphic regime and geomorphic characteristics of the river are expected to be minimal. The overall volume of water and drainage pattern in the Sacramento River (and the downstream Yolo Bypass and Delta) would be similar to existing conditions. The minor changes that would result from diversions from the Sacramento River would not affect the Yolo Bypass.

CEQA Significance Determination and Mitigation Measures

Construction and operation of Alternative 1, 2, or 3 would not conflict with provisions of the Yolo Bypass Wildlife Area LMP but would conflict with provisions of the Yolo County HCP/NCCP. The conflict of Alternatives 1, 2, and 3 with the provisions of the Yolo County HCP/NCCP would be a significant impact. Implementation of mitigation measures discussed under Impact WILD-1 would avoid, minimize, and compensate for impacts on special-status wildlife included in the Yolo County HCP/NCCP. With implementation of these measures, Alternatives 1, 2, and 3 would not conflict with the provisions of the Yolo County HCP/NCCP.

NEPA Conclusion

Construction and operation of Alternatives 1, 2, and 3 would result in the same effects as those described above for CEQA. Alternatives 1, 2, and 3 would result in a substantial adverse effect from conflicting with provisions of the Yolo County HCP/NCCP, but through implementation of mitigation measures, effects would be reduced to no adverse effect.

10.5 References

10.5.1. Printed References

Yellow = citation found in text, but no matching reference in this section.

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