

CHAPTER 4.4

VEGETATION AND WILDLIFE

4.4.1 Introduction

This chapter describes the vegetation and wildlife resources in the Fish Flow Project area including botanical, wetland, and wildlife resources. Fisheries resources are addressed in Chapter 4.3, "Fisheries Resources." Sections 4.4.2, and 4.4.3 describe the regional and project area environmental settings. Section 4.4.3, "Regulatory Framework," describes the federal, state, and local laws related to vegetation and wildlife resources. Potential impacts to these resources are analyzed in Section 4.4.5, "Impacts and Mitigation Measures" and mitigation measures are proposed that could reduce, eliminate, or avoid such impacts.

The Fish Flow Project area consists of the Upper and Lower Russian River mainstem (including a small section of the East Fork Russian River downstream of Coyote Dam at Lake Mendocino), Lake Mendocino and Lake Sonoma, and Dry Creek from Warm Springs Dam to the confluence with the Russian River. The Russian River Estuary (Estuary) is defined as the tidal portion of the Lower Russian River from the Pacific Ocean to the Duncans Mills area.

For the purposes of describing biological resources that may be affected by the Fish Flow Project, the lateral extent of the project area consists of the shoreline and adjacent vegetation that is dependent on the river/creek or lakes for water. The riparian zone along the Russian River and Dry Creek to the top of bank is included in the project area because riparian trees and shrubs can be deep rooted and dependent on subsurface waters from a stream. Lake Mendocino and Lake Sonoma project area boundaries extend along the upper shoreline. Regulated water levels in these reservoirs create an abrupt change between barren shoreline and upland vegetation with no extensive riparian zone present.

At the Estuary where the shoreline fluctuates with the tides and river mouth conditions, the project area boundary is defined as the estuarine and riparian habitat supporting wildlife resources within the 9-foot contour line in the lower seven miles of the Russian River from the Pacific Ocean to the Duncans Mills area. The outlet for the Estuary is managed at an elevation between seven and nine feet. Water surface elevation under this management ranges between 4.5 to nine feet between May 15 to October 15 (Environmental Science Associates, 2010). When the river mouth is open, water levels in the Estuary can be below mean sea level. Also, within the Estuary's nine-foot elevation project area are the lower portions of several tributaries, including Willow Creek, Sheephouse Creek, Freezeout Creek, and Austin Creek. The term "project vicinity" is occasionally used when discussing lands outside the project area, but which may be used by transient wildlife (e.g., birds with large spatial-use patterns).

4.4.2 Environmental Setting

Regional Setting

Vegetation communities and wildlife habitats within the Russian River watershed include a mosaic of herbaceous, shrub, and tree-dominated types, as well as aquatic and developed types. Broad vegetative community categories within the watershed include scrubs and chaparrals, oak savannas and woodlands, coniferous forests and woodlands, grasslands, coastal dune, and fresh and saline emergent wetlands. Generally, vegetation in the Russian River watershed is typical of north-south trending valleys occurring in the coastal ranges in Northern California. Sonoma and Mendocino counties represent a transition between southern (grassland, oak woodland, forest) and northern (boreal forest) vegetation types. In most locations along the Russian River, the river shoreline next to open water supports a discontinuous emergent freshwater wetland fringe, and a water disturbance-adapted (fluvial-ruderal) plant community on the shifting gravel bars. The river banks have a varied composition of riparian tree and shrub zones. The valley floor of interior areas in the upper Russian River watershed like the Ukiah Valley, Hopland Valley, Alexander Valley and Santa Rosa Plain support a wide wandering river channel with varying aged stands of riparian vegetation along the floodway leading up into tributaries and intergrading with oak savanna and valley grassland in the lowlands, oak woodlands at the base of foothills, and then oak forest and mixed evergreen forest in the mountainous headwaters. The patterns of vegetation on the hills are often strongly influenced by solar exposure (with forest typical on north facing slopes and chaparral, scrub, grassland and woodland patches typical of the south facing slopes) and underlying geology (soil depth, parent rock, chemistry, and available moisture).

In the Lower Russian River, below Dry Creek near Healdsburg, the river nears the Pacific Ocean and vegetation begins to grade into a coastal assemblage of riparian forest fringed by coastal forests characterized by redwood (*Sequoia sempervirens*), Douglas fir (*Pseudotsuga menziesii*), and California bay laurel (*Umbellularia californica*). As the river reaches the tidal Estuary, the riparian forest intergrades with a patchy occurrence of freshwater marsh. Coastal scrub covers the adjacent hillsides and ultimately coastal dune and the sandbar beach separates the Estuary from the Pacific Ocean.

While the overall watershed setting includes the wide variety of community types mentioned above, the areas anticipated to be potentially affected by the Proposed Project are immediately associated with the mainstem of the Russian River, Estuary, Dry Creek, and the shoreline habitats along Lake Mendocino and Lake Sonoma. Plant communities and wildlife habitat that are beyond the shoreline wetlands and riparian zones would be outside the influence of the Proposed Project. In most instances upland habitats, such as grasslands, coastal forests, oak woodlands, oak savannah, chaparral, coastal scrub, and coastal dune, would not be affected by the Proposed Project.

There is a variety of classification systems used to categorize California's vegetation. At a regional level, the landscape scale classifications developed by Robert Ornduff (Ornduff, Faber, & Wolf, 2003) and finer sub-classifications developed by David Holland (Holland R. F., 1986)

are used in this section to characterize native plant communities associated with the Proposed Project. Accordingly, native plant communities most closely associated with the Russian River and Dry Creek include Riparian Forest and North Coastal Forest (both include a subset of communities described below). Anthropogenic plant assemblages dominate the majority of the valley floor along much of the Russian River, such as ruderal, vineyard, orchard, field crops, and residential landscaping. These habitat types are generally dependent on irrigation in the summer.

Protection of biotic habitat areas is necessary because they are sensitive to change and the adverse effects of activities. Forests have been logged, natural areas converted to urban and agricultural uses, non-native species introduced, and barriers created as a result of development, roadway construction, installation of fencing, etc. These changes in the natural landscape have forced some wildlife into smaller areas in marginal habitat and limited dispersal and movement for native plants and animals.

Several small populations of plants and animals that are in danger of extinction due to the loss or alteration of habitat are protected by state and federal law. These species are highly sensitive to any change in their habitat and could be adversely impacted by development. Rare and endangered plant and animal species frequently provide essential links in the natural ecosystem.

Despite these disturbances, the Russian River watershed contains rich biotic resources and is home to numerous wildlife species. Botanical and wildlife species that are characteristic of the Russian River watershed are described in more detail in the following text of this chapter.

Project Area Setting

The following section describes the biological resources in the vicinity of the Fish Flow Project. Please refer to the Regional Setting section above for additional setting information. The Water Agency has conducted several plant and wildlife resource studies related to the Proposed Project. Methodology consisted of literature review; contact with various agencies such as the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW), search of the California Natural Diversity Database (CNDDDB) and California Native Plant Society (CNPS); and field surveys to verify existing information, identify wildlife habitats present, and to assess the presence and extent of potential habitat for special-status species.

Since the 1990s a substantial amount of biological information has been collected during field studies in the project area by the Water Agency as part of several monitoring and research. These studies include:

- Reptile and amphibian surveys of the Russian River mainstem, Dry Creek, and several tributaries.
- Riparian restoration and monitoring at several tributaries of the Russian River.
- Telemetry, distribution, and habitat studies of western pond turtle (*Actinemys marmorata*) in the Russian River.
- Pinniped monitoring at the Russian River barrier beach, Estuary, and coastal haulouts.

Vegetation and Wildlife

For the purpose of describing biological resources, the project area has been divided into Upper and Lower Russian River mainstem, Dry Creek, Russian River Estuary, and Lake Mendocino and Lake Sonoma. The vegetation types and representative plants are shown on Table 4.4-1. Table 4.4-2 lists the representative semi-aquatic and terrestrial wildlife species that may be found in the project vicinity.

Table 4.4-1. Plant Communities and Representative Plant Species in the Fish Flow Project Vicinity

| Common Name | Scientific Name |
|---|--|
| North Coastal Forest Coast Redwood Douglas fir California black oak Tanbark oak Pacific Madrone Big-leaf maple California bay laurel | <i>Sequoia sempervirens</i> <i>Pseudotsuga menziesii</i> <i>Quercus kelloggii</i> <i>Lithocarpus densiflorus</i> <i>Arbutus menziesii</i> <i>Acer macrophyllum</i> <i>Umbellularia californica</i> |
| Foothill and Valley Woodland (Oak Savannah) Valley oak Coast live oak California black oak Oregon oak Blue oak Canyon oak Gray pine | <i>Quercus lobata</i> <i>Quercus agrifolia</i> <i>Quercus kelloggii</i> <i>Quercus garryana</i> <i>Quercus douglasii</i> <i>Quercus chrysolepis</i> <i>Pinus sabiniana</i> |
| Chaparral Manzanita Chamise Scrub oak Toyon Poison oak Coyote brush | <i>Arctostaphylos spp.</i> <i>Adenostoma fasciculatum</i> <i>Quercus dumosa</i> <i>Heteromeles arbutifolia</i> <i>Toxicodendron diversilobum</i> <i>Baccharis pilularis</i> |
| Valley Grassland Slender oat Soft chess Little quake grass Foxtail chess Crabgrass California burclover Vetch | <i>Avena barbata</i> <i>Bromus hordeaceus</i> <i>Bromus madritensis ssp. rubens</i> <i>Briza minor</i> <i>Digitaria sanguinalis</i> <i>Medicago polymorpha</i> <i>Vicia spp.</i> |
| Coastal Scrub Coyote brush California coffeeberry California blackberry Sticky monkeyflower Poison oak | <i>Baccharis pilularis</i> <i>Frangula californicus</i> <i>Rubus ursinus</i> <i>Mimulus aurantiacus</i> <i>Toxicodendron diversilobum</i> |
| Coastal Dune Yellow sand-verbena Sea rocket Beach morning glory Beach bursage Yellow bush lupine Beach primrose | <i>Abronia latifolia</i> <i>Cakile maritime</i> <i>Calystegia soldanella</i> <i>Ambrosia chamissonis</i> <i>Lupinus arboreus</i> <i>Camissonia cheiranthifolia</i> |
| Riparian Woodland Fremont's cottonwood Arroyo willow Yellow willow Red willow Sandbar willow White alder Northern California black walnut | <i>Populus fremontii</i> <i>Salix lasiolepis</i> <i>Salix lucida</i> <i>Salix laevigata</i> <i>Salix exigua</i> <i>Alnus rhombifolia</i> <i>Juglans hindsii</i> |

Vegetation and Wildlife

| Common Name | Scientific Name |
|---|---|
| <ul style="list-style-type: none"> Mulefat California blackberry California wild grape Oregon ash Box elder Valley oak California bay laurel Blue elderberry Snowberry Dutchman's pipe Honeysuckle | <ul style="list-style-type: none"> <i>Baccharis salicifolia</i> <i>Rubus ursinus</i> <i>Vitis californica</i> <i>Fraxinus latifolia</i> <i>Acer negundo californicum</i> <i>Quercus lobata</i> <i>Umbellularia californica</i> <i>Sambucus mexicana</i> <i>Symphoricarpos albus</i> <i>Aristolochia californica</i> <i>Lonicera hispidula var. vacillans</i> |
| <p>Coastal and Valley Freshwater Marsh</p> <ul style="list-style-type: none"> Narrow leafed cattail Tule Nutsedge Water cress Spikerush | <ul style="list-style-type: none"> <i>Typha angustifolia</i> <i>Scirpus sp.</i> <i>Cyperus eragrostis</i> <i>Nasturtium officinale</i> <i>Eleocharis macrostachya</i> |
| <p>Aquatic Habitats</p> <ul style="list-style-type: none"> Pondweed Marsh pennywort Ditch carrot Water plantain Water primrose (Ludwigia) | <ul style="list-style-type: none"> <i>Potamogeton spp.</i> <i>Hydrocotyle ranunculoides</i> <i>Oenanthe sarmentosa</i> <i>Alisma lanceolata</i> <i>Ludwigia hexapetala, L. peploides montevidensis</i> |
| <p>Active Channel</p> <ul style="list-style-type: none"> Water primrose (Ludwigia) | <ul style="list-style-type: none"> <i>Ludwigia hexapetala, L. peploides montevidensis</i> |

Table 4.4-2. Representative Wildlife Species in the Fish Flow Project Vicinity

| Common Name | Scientific Name |
|--|---|
| <p>Amphibians</p> <ul style="list-style-type: none"> California newt California slender salamander Arboreal salamander Pacific chorus frog/treefrog Foothill yellow-legged frog American bullfrog | <ul style="list-style-type: none"> <i>Taricha torosa</i> <i>Batrachoseps attenuatus</i> <i>Aneides lugubris</i> <i>Pseudacris regilla (seirrae)</i> <i>Rana boylei</i> <i>Lithobates catesbeinus</i> |
| <p>Reptiles</p> <ul style="list-style-type: none"> Western fence lizard Northern alligator lizard Western yellow-bellied racer Common gopher snake Common garter snake Western rattlesnake Western pond turtle | <ul style="list-style-type: none"> <i>Sceloporus occidentalis</i> <i>Gerrhonotus coeruleus coerulens</i> <i>Coluber constrictor mormon</i> <i>Pituophis melanoleucus</i> <i>Thamnophis sirtalis</i> <i>Crotalus viridis</i> <i>Actinemys marmorata</i> |
| <p>Birds</p> <ul style="list-style-type: none"> Red-tailed hawk California quail Band-tailed pigeon Great horned owl Acorn woodpecker Black Pheobe | <ul style="list-style-type: none"> <i>Buteo jamaicensis</i> <i>Callipepla californica</i> <i>Columba fasciata</i> <i>Bubo virginianus</i> <i>Melanerpes formicivorus</i> <i>Sayornis nigricans</i> |

| Common Name | Scientific Name |
|----------------------------|--|
| Steller's jay | <i>Cyanocitta stelleri</i> |
| Western scrub jay | <i>Aphelocoma californica</i> |
| Common bushtit | <i>Psaltriparus minimus</i> |
| Wrentit | <i>Chamaea fasciata</i> |
| Western meadowlark | <i>Sturnella neglecta</i> |
| Red-winged blackbird | <i>Agelaius phoeniceus</i> |
| Belted kingfisher | <i>Ceryle alcyon</i> |
| Brown towhee | <i>Pipilo fuscus</i> |
| Song sparrow | <i>Melospiza melodia</i> |
| Mammals | |
| Raccoon | <i>Procyon lotor</i> |
| Striped skunk | <i>Mephitis mephitis</i> |
| Gray fox | <i>Urocyon cinereoargenteus</i> |
| Mountain lion | <i>Felis concolor</i> |
| Bobcat | <i>Lynx rufus</i> |
| California ground squirrel | <i>Otospermophilus beecheyi</i> |
| Western gray squirrel | <i>Sciurus griseus</i> |
| Deer mouse | <i>Peromyscus maniculatus</i> |
| Brush mouse | <i>Peromyscus boylei</i> |
| Dusky-footed woodrat | <i>Neotoma fuscipes</i> |
| Brush rabbit | <i>Sylvilagus bachmani</i> |
| Mule deer | <i>Odocoileus hemionus columbianus</i> |
| Feral pig | <i>Sus scrofa</i> |

Lake Mendocino and Lake Sonoma

The project area includes two large reservoirs on tributaries of the Russian River, Lake Mendocino is in the upper watershed on the East Fork Russian River, while Lake Sonoma is on Dry Creek located in the middle of the watershed. These lakes are inland where summer temperatures are much higher than along the coast. Riparian and marsh habitat is generally absent from the shoreline of the lakes due to managed, fluctuating water levels. The shorelines are typically barren with an upland plant community at the high water line. Lake Sonoma is surrounded by approximately 18,000 acres of protected lands owned by the U.S. Army Corps of Engineers (USACE). This land contains the diverse flora and fauna characteristic of dry inland regions of the Coast Range Mountains. Approximately 5,000 acres are set aside as a wildlife management area at Lake Sonoma. The USACE also owns Lake Mendocino, including the surrounding uplands at a total of approximately 3,500 acres. At both lakes mountainous north-facing slopes contain hardwood and coniferous forests, and on foothills oak woodlands and grasslands are common. Chaparral and grassland exists on shallow soils of south-facing slopes.

Russian River

The Russian River below the confluence of the East and West Forks flows from Ukiah Valley to the Pacific Ocean. Cool coastal conditions moderate temperatures year-round in the lower river. In contrast, the inland Russian River mainstem has hot, dry summers. Bank vegetation ranges from sparse to dense riparian forest. Some river banks are armored with rock riprap, and in a few places even automobile bodies. Adjacent to the river, habitats vary from urban, ruderal, agricultural, woodland, to forest. Largely, scouring during winter high flows provides the

dominant force that dictates where vegetation can establish and persist. Reviewing aerial photographs of the Russian River between the 1940s and current reveals that total cover by riparian trees and shrubs has actually increased as a result of sustained summer flows (Sonoma County Agricultural and Open Space District, 2016). Annual winter river flow scouring limits the establishment of marsh vegetation along the river to very small patches. In the Ukiah, Hopland, and Alexander valleys most lands are agricultural, typically vineyard. The Lower Russian River is primarily forested lands, with interspersed vineyards, and development associated with communities in the Healdsburg, Forestville, Guerneville and Monte Rio areas. Although development in and around the Russian River has been substantial, the river is an important source of water for many wildlife species and is used as a migration corridor and for cover, escape, and breeding.

The lower portion of the Russian River is a tidal estuary (Estuary) that extends from the Pacific Ocean upstream approximately seven miles to the Duncans Mills area. The Estuary can be characterized as a submerged or “drowned” river at the ocean with an open or closed sandbar barrier beach at the river mouth. Sea level rise associated with climate shifts could increase the depth below sea level. In more stable areas coastal dune vegetation occurs. The terrain adjacent to the Estuary is mountainous forest, woodland, and grassland habitats. Estuary bank vegetation consists of riparian forest, grazed grassland, sparse marshlands, and exposed gravel bars. Water conditions range from seawater at the river mouth to brackish upstream. The Estuary is used by many marine mammals, coastal birds, and shorebirds. The harbor seal (*Phoca vitulina*) is the most abundant marine mammal in the Estuary and is commonly found hauled out on the beach at the Russian River mouth and on logs in the Estuary. A well established, year-round harbor seal haulout is located at the mouth of the Russian River. Common birds of the Estuary include double-crested cormorant (*Phalacrocorax auritus*) and western gull (*Larus occidentalis*). These birds dive or forage for surface fish in the Estuary as well as in the nearby ocean. Shorebirds occasionally observed along the Estuary include western sandpiper (*Calidris mauri*) and great blue heron (*Ardea herodias*).

Dry Creek

Dry Creek below Warm Springs Dam at Lake Sonoma extends approximately 14 miles to the Russian River. Water releases from the dam provide year-round water to the creek. This perennial supply of water has increased the riparian zone to a dense cover of trees dominated by alder (*Alnus* sp.). Dry Creek and its riparian zone provides similar benefits as those described above for the Russian River. Plant and wildlife species found along Dry Creek are similar to those found along the mainstem of the Russian River (Table 4.4-1 and 4.4-2). Most of the Dry Creek valley, outside of the riparian zone, is under vineyard cultivation.

Plant Community and Wildlife Habitat

Below are descriptions of plant communities and related wildlife habitats within Fish Flow Project vicinity. There are aquatic and wetland habitats associated with waterbodies in the project area and terrestrial habitats that may occur adjacent to or near the project area. These plant communities and habitats are shown on Figure 4.4-1.



*Existing Vegetation - CALVEG, [ESRI file geodatabase] (2004), McClellan, CA: USDA-Forest Service, Zone 1 North Coast Mid 1998_2007_v1.gdb and Zone 1 North Coast West 2000_2007_v1.gdb

DISCLAIMER
 This map document and associated data are distributed for informational purposes only "AS-IS" at the published scale and provided without warranty of any kind expressed or implied. The positional accuracy of the data is approximate and not intended to represent survey map accuracy. The Sonoma County Water Agency assumes no responsibility arising from use of this information.



Fish Habitat Flows and Water Rights Project
Vegetation Communities Study Area

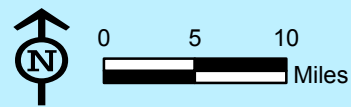


Figure 4.4-1

North Coastal Forest

North coastal forest occurs over much of the North Coast Ranges in Sonoma and Mendocino counties. Following the Ornduff classification of plant communities (Ornduff, Faber, & Wolf, 2003), north coastal forest includes north coastal coniferous forest, redwood forest, Douglas fir forest, and mixed-evergreen forest. North coastal forest generally occurs on north and west facing slopes and in steeper canyons and ravines. In the wetter regions and along the coastline, north coastal forest is typically dominated by one or more coniferous trees including coast redwood and Douglas fir, and may include hardwoods such as big-leaf maple and tan oak. On the dryer, inland slopes of the North Coast Ranges, conifers can be found with hardwoods such as California black oak (*Quercus kelloggii*), coast live oak (*Quercus agrifolia*), California bay laurel, and Pacific madrone (*Arbutus menziesii*).

The north coast forest habitat provides important foraging and nesting habitat for several wildlife species. Berries, forbs, conifer seeds, and oak acorns provide important food sources for species including western gray squirrel (*Sciurus griseus*), dusky-footed woodrat (*Neotoma fuscipes*), mule deer (*Odocoileus hemionus columbianus*), various species of woodpecker, and Stellar's jay (*Cyanocitta stelleri*). Avian predators such as Cooper's hawk (*Accipiter cooperii*) and great horned owl (*Bubo virginianus*) prey upon rodents and small birds in this habitat. In addition, north coastal forest provides shelter and breeding habitat for wildlife species such as nesting raptors; cavity nesters such as woodpeckers, western screech-owl (*Otus kennicottii*), and pygmy nuthatch (*Sitta pygmaea*); mammals including ringtail (*Bassariscus astutus*) and long-tailed weasel (*Mustela frenata*); and reptile and amphibians such as northern alligator lizard (*Elgaria coerulea*), ring-necked snake (*Diadophis punctatus*), and California giant salamander (*Dicamptodon ensatus*).

Valley and Foothill Woodland (Oak Savannah)

Within the project vicinity, valley and foothill woodland is dominated by oak species with varying degrees of canopy cover, and with grasses and scattered low shrubs between trees. In valleys with deep rich soils valley oak and California black oak occur. Coast live oak is a common oak in foothills. In dryer areas with shallow soils blue oak and gray pine dominate. A subtype of woodland known as oak savannah is characterized by a tree canopy which is less than 30 percent in density. Oak savannah typically occurs on dry and/or fine-textured soils. Savannahs are dominated by valley oak and coast live oak where they occur in open stands. Valley grassland is found between trees and herbaceous species grow in shaded areas within tree driplines. Oak woodlands, while common in California, are considered in decline due to seedling predation and loss due to development.

This habitat provides important foraging for numerous wildlife species. Oak acorns provide an important food source for species including western gray squirrel, California ground squirrel, mule deer, various species of woodpecker, and western scrub jay (*Aphelocoma californica*). Avian predators such as golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), and Cooper's hawk, prey upon rodents and small birds in this habitat. In addition, oak woodlands and savannahs provide shelter and breeding habitat for wildlife species such as nesting raptors; cavity nesters such as woodpeckers, house wrens (*Troglodytes aedon*), and western bluebirds (*Sialia mexicana*); mammals including mule deer, raccoon (*Procyon lotor*),

brush rabbit (*Sylvilagus bachmani*), and feral pig (*Sus scrofa*); and reptile and amphibians such as western fence lizard (*Sceloporus occidentalis*), common gopher snake (*Pituophis melanoleucus*), arboreal salamander (*Aneides lugubris*) and Pacific treefrog/chorus frog *Pseudacris regilla (seirrae)*.

Chaparral

Chaparral is one of the most characteristic plant communities of California, and occurs only in California. It is characterized by hard-leaved low-growing shrubs, and is typically devoid of tree and herbaceous plant species. This is in part attributable to shading and competition from the dense growing brush. Characteristic plant species include manzanita, chamise (*Adenostoma fasciculatum*), toyon (*Heteromeles arbutifolia*), and California lilac (*Ceanothus* sp.). Chaparral occurs in the project vicinity on hot, dry southern slopes.

Wildlife species that occur within chaparral are those that inhabit drier, more arid regions of the county and include western fence lizard, California ground squirrel, and brush rabbit. Birds such as common bushtit, California quail, and wren are commonly occurring species that use chaparral for foraging, cover, and nesting. Predators include coyote (*Canis latrans*) and American badger (*Taxidea taxus*) that utilize open areas in chaparral for hunting prey.

Valley Grassland

Valley grassland occurs most extensively in the Central Valley of California, but also is present in some of the low valleys or gentle slopes of the Coast Ranges, including the project vicinity. Non-native grassland habitat is commonly distributed in valley and foothills of most of California, except for the north coastal and desert regions. Valley grassland (native and non-native) occurs in the open areas adjacent to or within woodland and forest habitats. Within the project area valley grassland may fringe the riparian zone along the Russian River. This habitat typically occurs on fine-textured soils, usually clay, moist, or even waterlogged during the winter rainy season, and very dry during the summer and fall. European settlement of the area introduced non-native annual grasses, which have, for the most part, replaced the native perennial grasses that used to dominate this biotic community. Plant species characteristic of valley grassland in the project area include Harding grass (*Phalaris aquatica*), soft chess (*Bromus mollis*), slender oats (*Avena barbata*), clover (*Trifolium* spp.), lotus (*Lotus* spp.), California burclover (*Medicago polymorpha*), and vetch (*Vicia* spp.).

Wildlife species typically observed foraging in valley grasslands include song sparrow (*Melospiza melodia*), red-winged blackbird (*Agelaius phoeniceus*), and American pipit (*Anthus rubescens*). Valley grasslands provide cover and foraging habitat for small mammals, reptiles, and avian species, including Botta's pocket gopher (*Thomomys bottae*), common gopher snake, common kingsnake (*Lampropeltis getulus*), and raptors such as red-tailed hawk. This habitat is also important for common ground nesting birds such as western meadowlark (*Sturnella neglecta*) and mourning dove (*Zenaidura macroura*). Grasslands provide open foraging habitat for wildlife species such as white-tailed kite (*Elanus leucurus*) and mule deer that seek cover in adjacent woodland.

Coastal Scrub

Although coastal scrub is found in both northern and southern California, the form and plant species composition varies greatly between the two regions (Barbour, Keeler-Wolf, & Schoenherr, 2007). This variation is mainly a result of the shift from cooler-moister climates in the north to warmer-drier climates in the south. This community is generally characterized by stands of low growing shrubs such as coyote brush and a somewhat indistinct assemblage of herbaceous plants. Other common shrubs include California coffeeberry (*Frangula californica*), California blackberry (*Rubus ursinus*), sticky monkeyflower (*Mimulus aurantiacus*), and poison oak (*Toxicodendron diversiloba*). Understory species composition is influenced by light penetration through the canopy, as canopies vary from dense and closed. Common associated species include grasses and forbs, such as those found in the surrounding grassland communities. Coastal scrub occupies lands in the hills in the vicinity of Russian River Estuary.

Animal species inhabiting coastal scrub habitats are predominantly those that have adapted to dry conditions, such as insects, spiders, and reptiles. There are also many birds and mammals that are associated with this habitat, but most are not restricted to coastal scrub and occur in the surrounding habitats. Typical mammals found in coastal scrub habitat include species such as black-tailed jackrabbit (*Lepus californicus*), coyote, and striped skunk (*Mephitis mephitis*). Resident birds include such species as Anna's hummingbird (*Calypte anna*), Bewick's wren (*Thryomanes bewickii*), and California towhee (*Pipilo maculatus*). Coastal scrub habitat also provides year-round foraging for many birds of prey, such as red-tailed hawk and turkey vulture (*Cathartes aura*). Reptiles such as western fence lizard, and western rattlesnake (*Crotalus viridis*) are also typically found in this habitat.

Coastal Dune

Coastal dune communities are generally dynamic, high-energy habitats that are shaped by factors unique to a coastal environment between terrestrial and marine communities (Barbour, Keeler-Wolf, & Schoenherr, 2007). Because of intense wave action, rapid rate of sand movement, strong winds, and presence of sea water, plants are generally unable to successfully colonize this habitat, particularly directly along the shoreline. As a result little or no vegetation is present within the beach habitat in the project area at the Russian River mouth. Coastal dune habitat occurs further away from the immediate shoreline and is more protected from the effects of sand movement, wind, and salt spray. This habitat may also have more abundant groundwater (Holland R. F., 1986). Such conditions allows for some patches of prostrate, herbaceous plants to establish. In the project vicinity, this habitat is generally characterized by single-species stands of European beach grass (*Ammophila arenaria*) and patches of yellow sand-verbena (*Abronia latifolia*), sea rocket (*Cakile maritima*), beach morning glory (*Calystegia soldanella*), beach bursage (*Ambrosia chamissonis*), coastal buckwheat (*Eriogonum latifolium*), dune sagebrush (*Artemisia pycnocephala*), seashore bluegrass (*Poa douglasii*), seaside woolly sunflower (*Eriophyllum staechadifolium*), yellow bush lupine (*Lupinus arborea*), and beach primrose (*Camissoniopsis cheiranthifolia*).

Compared to other habitats, beaches and dunes may appear to support few animal species. However, these communities are complex habitats and support many species of animals unique to shorelines, several of which are too small to notice. Successful animal inhabitants of beaches and dunes include benthic invertebrates that live between sand grains and annelid worms that

burrow into the sand. Various bivalve and snail species, as well as many species of small crustaceans, also inhabit these habitats. Many bird species use beaches and dunes as feeding and resting areas. Shorebirds and wading birds feed on prey that either wash out of the sand due to wave action, or are exposed during low tide. Some birds prefer to nest or rest on bare sands. Marine mammals, such as harbor seal, haulout and rest on beaches and also give birth and molt here.

Riparian Woodland

Riparian vegetation, or the plants associated with a stream environment, once covered much of the Russian River floodplain and tributaries. Generally, riparian areas are associated with and/or encompass elevations adjacent to streams up to the floodplain elevation that matches the 100 to 500 year storm event. These large intense events along a river system are the primary driver for mobilizing sediments, scouring vegetation, and creating new places for vegetation to colonize. Historically, riparian vegetation along the Russian River was removed for agriculture, gravel mining, logging, flood control, and urbanization. Today, riparian vegetation along the Russian River and numerous tributaries exists in thin and in some places discontinuous strips. Riparian plant communities often show abrupt changes in species composition along stream banks due to differing preferences of seasonal water levels and tolerance to scouring during winter floods. Largely high winter flows, dictate any large changes to the system (Barbour, Keeler-Wolf, & Schoenherr, 2007), (Holland R. F., 1990) (Holland R. F., 1986), (Warner, 1984).

For the reasons described below, riparian zones have a high value for wildlife. With close proximity to water and a multi-story canopy, riparian habitats provide important breeding, foraging, migration, dispersal, and cover habitat for numerous wildlife species. Riparian habitats benefit fish and other aquatic organisms through nutrients provided in the form of leaf litter and insects; shelter provided by scour pools, woody debris, and root masses; and cool water temperatures maintained by shading of all or parts of streams. Agricultural areas also benefit from riparian habitats. Trees in riparian areas provide stabilization of banks and erosion control and prevent woody debris from entering agricultural lands during peak flood flows. Riparian areas also link fragmented upland habitats together. Because of its importance to terrestrial and aquatic wildlife species, riparian habitat has been afforded special regulatory protection, namely from the CDFW.

Wildlife species commonly found in riparian habitats include mule deer, dusky-footed woodrat, gray fox (*Urocyon cinereoargenteus*), raccoon, downy woodpecker (*Picoides pubescens*), belted kingfisher (*Ceryle alcyon*), northern oriole (*Icterus galbula*), brown towhee (*Pipilo fuscus*), common bushtit (*Psaltriparus minimus*), song sparrow, and common kingsnake. Neotropical migrant songbirds use these habitats as movement corridors and nesting habitat. Riparian areas provide habitat for several raptor species such as the red-shouldered hawk (*Buteo lineatus*), red-tailed hawk, and great horned owl. Raptors often nest in riparian areas and forage in adjacent grasslands and agricultural fields. Characteristic riverine species that also use riparian habitats include river otter (*Lutra canadensis*), Pacific treefrog, and western pond turtle (*Actinemys marmorata*).

While the geographic ranges presented in Holland (1986) would suggest that only a few riparian habitat types occur within the Russian River watershed, floristically, the riparian habitats are very diverse. The riparian corridor along the Russian River can be divided into an interior and coastal zone largely based on climate and associated plant communities. The Russian River can be divided into three major riparian zones (coastal, transitional and interior) based on distance from and buffering influence of the ocean (Figure 4.4-1). The river valley and flood plain above Healdsburg gets less precipitation because of the rain shadow of the Coast Ranges and as a result supports oak woodland and forest. Additionally, the Russian River above Healdsburg lacks a regular incursion of coastal fog, which helps buffer temperature and humidity extremes and allow more mesic species to persist. Dry Creek riparian habitat is intermediate in composition to coastal and inland riparian habits and is comparable to the transitional habitat found in Alexander Valley near Geyserville. The coastal riparian zone generally includes conifers (Douglas fir and redwood) along the 100 year flood plain. Intermediate areas have some conifers in the watershed but they are generally above the 100 year flood zone elevation and often associated with upper tributaries. Finally inland riparian habitats are dominated by oaks and mixed hardwoods, conifers if present are found high in the tributaries, at elevations with adequate precipitation.

The mix of species in the riparian corridor (Fremont's cottonwood [*Populus fremontii*], willows [*Salix* spp.], and white alder [*Alnus rhombifolia*]) in the Upper Russian River contrasts markedly with associated upland vegetation occupying the flood plain (valley oak, California bay laurel, and California buckeye). In the Lower Russian River valley, below Healdsburg, the river and associated plant communities shift to mixed evergreen forest and a conifer-dominated (redwood and Douglas fir) system with patches of hardwoods (alder, tanoak, Fremont's cottonwood, and willows) reflecting seral shifts following disturbance events. In the Lower Russian River, many of the dominant riparian trees (redwood, white alder, and willows) are also associated with upland areas. Below is a description of several riparian types in the project area.

White Alder Riparian Forest

White alder riparian forest occurs on intermittently flooded or saturated soils along riparian corridors of perennial streams. Tree species in the white alder riparian forest of the project area are typically dominated by medium-tall, broad-leafed deciduous forest species such as white alder, box elder, various willow species (*Salix* spp.), Oregon ash (*Fraxinus latifolia*), and California bay laurel. A mixture of understory shrubs such as California blackberry, poison oak, and spicebush (*Calycanthus occidentalis*) are found within this habitat. White alder riparian forests are prevalent along Dry Creek and the mainstem of the Russian River. This habitat is similar to North Coast riparian scrub, but it typically has a higher canopy and is dominated by white alder. White alder is associated with a rhizobium bacteria species that helps the plant fix nitrogen. This forest type often fringes streams and rivers and can rapidly colonize alluvially-disturbed areas on the floodplain.

Central Coast Live Oak Riparian Forest

Central Coast live oak riparian forest is a relatively low, evergreen riparian forest, usually with an open appearance, dominated by coast live oak. This habitat is further characterized as occurring on drier, outer floodplains along perennial streams. Sonoma County represents the northernmost extent of this habitat type, which extends as far south as Point Conception, and

probably occurs in the more xeric regions of the San Francisco Bay area and surrounding counties. Within the project area, the overstory canopy of this community is typically dominated by coast live oak, with either no understory or an understory of smaller willows or Armenian blackberry.

Central Coast Arroyo Willow Riparian Forest

While Central Coast arroyo willow riparian forest is characterized as occurring primarily along the coast from Monterey to Santa Barbara, riparian forests dominated by willow are also common on low-gradient creeks and drainages in many areas of the project area. This habitat type is distinguished by a dense, low, closed-canopy broadleaf winter-deciduous riparian forest dominated by arroyo willow, but occasionally by other willow species, including red willow (*Salix laevigata*) and yellow willow (*Salix lucida*). Arroyo willow-dominated riparian forests are particularly prevalent along low-gradient streams or drainages in the Santa Rosa Plain. The understory is typically comprised of shrubs such as mule fat and American blackberry and various emergent marsh species such as narrow leafed cattail (*Typha angustifolia*) and tule (*Scirpus* sp.). Sometimes, other early seral tree species such as Fremont's cottonwood are present. In general, tree height and/or maturity differentiates this community from that of North Coast riparian scrub.

North Coast Riparian Scrub

North Coast riparian scrub occurs along sand and gravel bars and stream mouths from Sonoma County north into Oregon. While both this habitat and Central Coast arroyo willow riparian forest are dominated by willow species, this habitat differs from the latter in that the trees are smaller and more shrub-like and create a seemingly impenetrable thicket of willows and other broadleaf, deciduous riparian species. A mixture of early seral species dominate this habitat, including shrub-sized stages of tree species such as willow and Fremont's cottonwood, as well as other "true" shrub species such as coyote brush (*Baccharis pillularis*), Mexican elderberry (*Sambucus mexicana*), and California blackberry. The non-native periwinkle (*Vinca major*) sometimes grows along the banks, as well.

Coastal and Valley Freshwater Marsh

Coastal and valley freshwater marsh occur in low-velocity systems that are permanently flooded by freshwater. This habitat is present along the Russian River and in freshwater portions of the Estuary. The habitat is typically dominated by tall (12-15 feet), perennial, emergent monocots such as tules and cattails. However, many permanently inundated or saturated stream corridors within Russian River watershed can also support a much shorter vegetation canopy dominated almost exclusively by annual and perennial herbs and forbs such as nutsedge (*Cyperus* spp.), water cress (*Nasturium officinale*), marsh pepper (*Polygonum hydropiper*), spikerush, rush (*Juncus* spp.), scouring rush (*Equisetum hyemale affine*), water speedwell (*Veronica anagallis-aquatica*), water parsley (*Oenanthe sarmentosa*), Dallis grass (*Paspalum dilatatum*), and crabgrass (*Digitaria sanguinalis*).

Freshwater marsh and riparian areas also provide considerable habitat for the non-native water primrose (specifically *Ludwigia hexapetala* and *L. peploides montevidensis*) along the Russian River. These are semi-tropical members of the evening primrose family originating from Central

and South America that have invaded North American, European, and Australian river and wetland habitats (Grewell, Netherland, & Skaer Thomason, 2016). The plant exhibits a great degree of morphological plasticity and the taxonomy of the plant has been updated in the new Jepson Manual (Grewell, 2012a). The plant has a broad tolerance to flow, inundation, and moisture levels and has been observed colonizing gravel bars and backwater areas from below Lake Mendocino to the Estuary. The plant reproduces through vegetative fragments as well as seed. This plant has demonstrated an ability to rapidly colonize fluvially-disturbed areas such as low-lying agricultural fields, gravel bars and bare mud banks. The plant forms dense mats that can outcompete several native aquatic plants, such as pondweed (*Potamogeton* sp.), brooklime (*Veronica* sp.), and pennywort (*Hydrocotyl* sp.), and some possibly native emergent species.

Water primrose roots into the shoreline and returns annually from the roots to spread out over the water. If not scoured by winter flows the plant can build up significant biomass in the water column that can hinder flow and cause localized decreases in dissolved oxygen as dead plant material decompose. Also, this semi-tropical plant is intolerant to freezing temperatures. Exposed portions of the plant will die from cold; however, water can buffer the effects of low temperatures, protecting the lower stems and roots from freezing so a complete die-off is unlikely.

Over the last 10-20 years water primrose has colonized banks, gravel bars, and backwater areas along the Russian River. Abundance year to year is driven by the scouring effect of high winter flows, which remove plants from higher velocity areas, but can disperse plant fragments and seeds to new locations. Also, the cover of water primrose can be reduced seasonally where plants are exposed to freezing temperatures. Efforts to limit the spread of this species by physical removal often end up spreading it even more because of its habit of reproducing from vegetative fragments. (Grewell, 2012b)

Recent studies by the U.S. Department of Agriculture (Thomason Skaer, Grewell, & Netherland, 2016) indicate that the spread and persistence of water primrose in the Russian River watershed is dependent on river hydrology and to a lesser degree available nutrients. The plant was found to colonize effectively via fragment (or less often by seed) during low flow conditions. Water primrose patches were observed to contract during low velocity conditions and expand in higher velocity conditions, probably as a result of fragments colonizing the wet shoreline. Seasonal impoundments (like flashboard dams in the Guerneville area and Mirabel inflatable dam) were observed to limit the colonization of primrose by reducing available shallow shoreline habitat. The plant is successful in low nutrient environments suggesting it may have high-nutrient-use efficiency adaptations that help it succeed in relatively nutrient poor areas like the Upper Russian River project area. This plant has invaded much of the low-gradient Laguna de Santa Rosa, the largest tributary to the Russian River, including low-lying agricultural fields. Accumulations of plant material have built up over time and completely filled the water column as water velocities in the Laguna are not great enough to scour the plant.

Animal species typically found in seasonal and perennial water and wetland habitats include birds, such as great blue heron, mallard (*Anas platyrhynchos*), marsh wren (*Cistothorus*

palustris), and red-winged blackbird, reptiles, such as common garter snake, and amphibians, such as California newt, Pacific treefrog, and western toad (*Anaxyrus boreas*).

Freshwater Seep

Several of the plant communities within the Russian River watershed are integrally tied to its complex geologic history (e.g., serpentine grassland and chaparral; geothermal areas). Among these are freshwater seeps, which develop where fissures or breaks in the soil profile allow groundwater to seep to the surface. These seeps are either seasonal or perennial features that occur on hillsides or even, in some cases, the bottom of established drainages. Freshwater seeps support mostly a low- to medium-high cover of annual and perennial herbs and forbs, especially sedges and grasses. Plant species differ considerably between seep areas, but, in general, freshwater seeps are dominated by grasses such as (e.g., Italian ryegrass [*Lolium multiflorum*], creeping wild blue rye [*Leymus triticoides*], mannagrass [*Glyceria occidentalis*]), sedges (e.g., spikerush), and rushes) interspersed with annual forbs such as buttercup (*Ranunculus muricatus*) and pennyroyal (*Mentha pulegium*). These seeps can provide an important source of water for wildlife in the area.

Wet Meadow

Holland (1986) does not specifically characterize any type of low-elevation meadow, but the rolling topography of Sonoma County has created extensive areas of wet meadows in swales and other areas through sustained ponding or saturation of soils by precipitation, surface runoff from adjacent uplands, and/or drainage flow. Wet meadows would be differentiated from associated vernal pool habitats described by Holland (1986) in that vernal pools are typically depressional “pools” or swale features that develop on unique soil formations and support a low-growing, often relatively sparse cover of annual herbs and grasses. Wet meadows occur in swales, valley floors, on hillsides with drainage flows and typically support a much denser, medium-to high-density cover of primarily grasses with some herbs, sedges, and rushes. Species often present include creeping wild blue rye, bentgrass (*Agrostis exarata*), red fescue (*Festuca rubra*), sedges (*Carex* sp.), Italian ryegrass, velvet grass (*Holcus lanatus*), annual beard grass (*Polypogon monspeliensis*), Mediterranean barley (*Hordeum marinum* var. *gussoneanum*), along with some herbs such as poison hemlock (*Conium maculatum*), curly dock (*Rumex crispus*), loosestrife (*Lythrum hyssopifolium*), pennyroyal, and rushes.

Coastal Brackish Marsh

Coastal brackish marshes are usually found at the interior edges of coastal bays and estuaries or in coastal lagoons. While these marshes are subject to tidal inundation, they remain brackish from freshwater input. Salinity may vary considerably and may increase at high tide or during seasons of low freshwater runoff or both. Species present often include *Carex* species (e.g., *Carex harfordii* and *Carex obnupta*), saltgrass (*Distichlis spicata* var. *spicata*), rushes, pickleweed (*Salicornia* sp.), tule, and cattail. The tidal influence in the Estuary provides conditions for coastal brackish marsh but freshwater marsh is predominantly found in the Estuary project area.

Aquatic Communities

Plants and animals associated with aquatic communities are dependent on perennial water, and can be defined (during low flow periods) as the community of plants, algae, invertebrates, vertebrates, etc contained entirely in the water. The aquatic community is highly influenced by adjacent habitats. When trees, shrubs, grasses and herbaceous plants are adjacent to the river channel, they create shaded riverine aquatic habitat. The vegetation creates a microclimate of cooler water temperatures. Insects and plant material that fall from riparian plants into the river enhance aquatic food webs. Trees and shrubs growing along river banks create shaded areas of rivers that keep water temperatures low during the summer, which can be important for some wildlife, and primary production from algae. In addition, the roots, branches and other submerged plant materials provide cover for wildlife, as well as nutrients and sources of invertebrates. This zone overlaps with some of the common plant species found in freshwater marsh. Truly aquatic plants (rooted under water) are not abundant in the Russian River. Dominant plant species in the aquatic zone in the Russian River include pondweed (*Potamogeton* spp.), water primrose, marsh pennywort (*Hydrocotyle ranunculoides*), water speedwell (*Veronica anagalis-arvensis*), and ditch carrot (*Oenanthe sarmentosa*).

Algae plays a major role in this community as a primary food producer. Periphyton (algae attached to substrate) begins growing following the spring drawdown in the littoral zone. Periphyton forms dense accumulations of a variety of algal groups and depending on temperatures and light intensity may experience several life cycles before high water returns in the fall and winter. When the algae begin their reproductive phase, they release from the substrate and become planktonic, often accumulating in backwater areas and along shorelines. In the Estuary, wigeon grass (*Ruppia cirrosa*) can form large and dense populations in brackish water.

Active Channel (Fluvial-Ruderal) Communities

The portion of a river below the ordinary high water mark experiences seasonal shifts in water depth, velocity, and dramatic changes in sediment deposition over time. This community can be classified as “fluvial-ruderal” for a habitat and plant community zone disturbed often by fluvial conditions. This area is largely dominated by species adapted to inundation and scouring, and have a variety of adaptations that allow for rapid colonization and growth in this regularly disturbed zone. This community provides an important buffer during low flow periods between aquatic and upland habitats. These areas are largely dominated by recently scoured and/or deposited gravel, sand and silt bars. All of the Russian River and Dry Creek channels have been incised from historic impacts such as gravel mining, channelization, agricultural practices, timber harvest, and urbanization. This incision has resulted in step stream banks, an active channel that often extends from bank to bank, and a disconnection from the historic flood plain and associated wetlands. This dynamic zone and freshwater marsh are the communities most likely to be affected by changes in minimum instream flows from Lake Mendocino and Lake Sonoma.

Modified Landscapes

Eucalyptus Stands

Eucalyptus often single species stands of blue gum (*Eucalyptus globulus*), red iron bark (*Eucalyptus sideroxylon*), and river gum (*Eucalyptus camaldulensis*). This habitat includes those areas where eucalyptus is the sole or dominant tree in the canopy. The canopy is typically continuous, with infrequent shrubs and a sparse ground layer. Eucalyptus trees release chemicals into the soil that serve to hinder the growth of other plants. This is known as allelopathy and results in the dense, monofloristic groves scattered in small patches throughout the Russian River watershed.

Although eucalyptus is a species not native to California, it can provide important habitat for nesting raptors such as red-tailed hawk and great horned owl. Many raptors require large trees with fairly dense canopies adjacent to appropriate foraging habitat (e.g. grasslands) for nesting habitat. In the past, large trees in valleys were typically found within riparian habitat or oak woodlands. Development and lack of recruitment has reduced the availability of these habitats and eucalyptus is often the largest and densest habitat available.

Urban

Construction of residential and commercial buildings has resulted in introduction of landscape vegetation and rerouting of drainages and creeks. Remnant stands of coast redwood, Douglas fir, and valley oak can be found along property boundaries and creeks. Landscape plant species have mixed with native species in these areas and are now commonly found along local creeks.

Wildlife commonly found in urban habitats is a mixture of native and introduced species. These species are tolerant of human disturbance and include brown towhee, northern mockingbird (*Mimus polyglottos*), Brewer's blackbird (*Euphagus cyanocephalus*), house sparrow (*Passer domesticus*), and various rodents including house mouse (*Mus musculus*). Other species that forage in urban habitats include western scrub jay, American crow (*Corvus brachyrhynchos*), opossum (*Didelphis virginiana*), and raccoon.

Ruderal

Ruderal habitats are those areas that have been heavily disturbed and provide little, if any, habitat for plant or wildlife species. These habitats are typically sparsely vegetated by non-native grasses and herbs. Wildlife species that typically occupy urban habitat may also occupy ruderal habitat, including pocket gopher and deer mouse.

Agricultural

Depending upon the type of agricultural operation and level of associated vegetation removal, agricultural lands typically do not provide substantial natural habitat for plant and animal species, although grasses and wildlife adapted to human disturbance may occur on agricultural lands during various times of the year.

Wildlife Movement and Nursery Sites

Due to the location and diversity of the plant communities and habitats present, the project area supports various types of wildlife movement (i.e., dispersal, seasonal migration, and local

movements within home ranges). Terrestrial mammals, such as mule deer, use the cover of the riparian forests for protection from predators as they move between foraging areas. Similarly, amphibians and reptiles use the protective cover of this habitat as they disperse from their aquatic breeding sites. Migratory waterfowl use the waters and wetlands for their lush food supplies during their seasonal migration.

In addition to facilitating wildlife movement, the vegetation communities and habitats present in the project area support wildlife nursery sites. A great blue heron rookery is adjacent to the Estuary (CDFW, 2016a). Several frog and toad species may use shallow shoreline and wetland habitats for breeding and tadpole development. Hatchling western pond turtles may use wetlands for cover from predators and foraging. The beach habitat at the mouth of the Russian River is a pupping site for harbor seals where pregnant females give birth and nurse their young (SCWA & Stewards, 2016). This haulout is considered the largest in Sonoma County (SCWA & Stewards, 2016). There are also several known haulouts in the Estuary at logs and rock outcroppings, although these haulouts are smaller and used by fewer pinnipeds. The first known records for the harbor seal haulout were established in 1972 and their numbers at the site have steadily grown (SCWA & Stewards, 2016).

Wetlands and “Waters of the United States”

From a biological resources perspective, wetlands are highly productive, diverse, and complex ecosystems that are either permanently or seasonally wet and support specially adapted vegetation. Wetlands have beneficial functions of improving water quality by filtering out sediment, debris, or pollutants; providing habitat for waterfowl and other wildlife; and providing recreational and aesthetic resources. Wetlands provide a source of water and/or breeding habitat for several wildlife species.

Potential Section 404 Clean Water Act jurisdictional wetlands, including “waters of the United States,” in the project area consist of all of the water features and adjacent wetland vegetation. Also, much of the Russian River is considered “navigable waters” and is under the jurisdiction of the Rivers and Harbors Act, see Section 4.4.3, Regulatory Framework, for more details.

Special-Status or Sensitive Natural Communities

The California Natural Diversity Data Base (CNDDDB) managed by the CDFW was searched for special-status or sensitive natural community occurrences recorded in the project vicinity. Based on this search, the following five sensitive natural communities are recorded in the project vicinity: Northern Interior cypress forest, serpentine bunchgrass, northern hardpan vernal pool, coastal brackish marsh, coastal and valley freshwater marsh (CDFW, 2016a). However, coastal and valley freshwater marsh is the only sensitive community present in the project area. The coastal brackish marsh reported by CNDDDB in the Russian River Estuary was based on USFWS National Wetland Survey Maps of 1982. Vegetation mapping conducted by the Water Agency (SCWA, 2010) classified this area as freshwater marsh. Coastal and valley freshwater marsh was reported at Duncans Mills Marsh along Orrs Creek near Duncans Mills and along Willow Creek that flows into the Estuary. Also, coastal and valley freshwater marsh is present in the lower Estuary at Penny Island and south of the island, which was previously considered

coastal brackish marsh. Additionally, although not reported by the CNDDDB, northern dune scrub is also present in the vicinity of the Russian River mouth, but outside of the project area.

In addition to the sensitive natural communities mentioned above, regulatory and resource agencies consider oak woodlands, waters and wetlands, and riparian woodlands and forests sensitive (see Section 4.4.3, Regulatory Framework, for more details).

Special-Status Plant and Wildlife Species

Several special-status plant and wildlife species are known to occur in the Russian River watershed. Special-status species are defined as rare, threatened, endangered, candidate, or other Species of Special Concern as described in Section 4.4.3, Regulatory Framework. For the purposes of this document, special-status species are those species that are: 1) under the protection of the federal Endangered Species Act (FESA); 2) under the protection of the California Endangered Species Act (CEQA); 3) considered a Species of Concern by the USFWS and/or the CDFW; 4) protected under the California Fish and Game Code or listed on the Special Animals list (CDFW, 2016b); 5) protected under the California Native Plant Protection Act; and/or 6) considered rare, threatened, endangered, or presumed extinct by the California Native Plant Society (CNPS). Also, birds and marine mammals protected under the Marine Mammal Protection Act and Migratory Bird Act that may occur in the project area are considered special-status wildlife.

The potential occurrence of special-status plant and animal species in the project area was initially evaluated by developing a list of special-status species that are known to or have the potential to occur in the project vicinity (Tables 4.4.3 and 4.4.4). These lists were primarily derived from a search of the CNDDDB (CDFW, 2016a) and CNPS Electronic Inventory (California Native Plant Society, 2016) for special-status species occurrences recorded on the Ukiah, Elledge Peak, Purdys Gardens, Hopland, Cloverdale, Asti, Jimtown, Healdsburg, Geyserville, Warm Springs Dam, Guerneville, Duncans Mills, Camp Meeker, and Arched Rock USGS 7.5-Minute quadrangles, and review of the USFWS list of federal endangered and threatened species for the same quadrangles. Other sources used included biological documents and staff knowledge at the Water Agency and interviews of local expert biologists. The potential for occurrence of those species included on the list were then evaluated based on the habitat requirements of each species relative to the existing conditions in the project area, and results of previous biological resources studies.

Special-Status Plants

Based on review of the databases and other information sources, 97 special-status plant species, including mosses, have been identified as occurring or potentially occurring in the vicinity of the project area. However, 65 of these plants are considered unlikely to occur within the project area for reasons such as absence of essential habitat requirements for the species, or the distance to known occurrences and/or the species distributional range. These species are listed on Table 4.4.3 and not discussed further in this section. The remaining 32 plants are considered to have low, moderate, or high potential to occur within the project area, based on known occurrences and availability of suitable habitat. These species are summarized in Table 4.4-4.

Vegetation and Wildlife

Plants with a low potential of occurrence are typically species that may occur in the project vicinity but due to habitat requirements would not occur within the project area. For example, several rare plant species occur in coastal dune, coastal scrub or coastal prairie habitats (see Table 4.4-4). These coastal habitats are present at Goat Rock State Park, which contains coastal bluffs and the coastal strand at the Russian River mouth. However, the project area within the Estuary does not include any coastal scrub or coastal prairie habitats. The project area along the Russian River Estuary at the coastal strand and river mouth consists of the area below nine foot contour elevation, which is unvegetated sand. Plants that have a moderate to high potential of occurring in the project area are described in detail in Table 4.4.4.

Table 4.4-3. Special Status Plant Species Unlikely to Occur in the Fish Flow Project Area Due to Habitat Restrictions or Limited Ranges¹

| Scientific Name (Common Name) | Status | Comment |
|--|-------------------|----------------|
| Vernal Pool Dependent | | |
| <i>Blennosperma bakeri</i> (Sonoma sunshine) | FE, CE, CNPS 1B.1 | |
| <i>Downingia pusilla</i> (dwarf downingia) | CNPS 2B.2 | |
| <i>Hesperevax caulescens</i> (hogwallow starfish) | CNPS 4.2 | |
| <i>Horkelia bolanderi</i> (Bolander's horkelia) | CNPS 1B.2 | |
| <i>Lasthenia burkei</i> (Burke's goldfields) | FE, CE, CNPS 1B.1 | |
| <i>Lasthenia conjugens</i> (Contra Costa goldfields) | FE, CE, CNPS 1B.1 | |
| <i>Limnanthes vinculans</i> (Sebastopol meadowfoam) | FE, CE, CNPS 1B.1 | |
| <i>Microseris paludosa</i> (marsh microseris) | 1B.2 | |
| <i>Navarretia leucocephala</i> ssp. <i>bakeri</i> (Baker's navarretia) | CNPS 1B.1 | |
| <i>Navarretia leucocephala</i> ssp. <i>plieantha</i> (many-flowered navarretia) | FE, CE, CNPS 1B.2 | |
| <i>Perideridia gairdneri</i> ssp. <i>gairdneri</i> (Gairdner's yampah) | CNPS 4.2 | |
| <i>Ranunculus lobbii</i> (Lobb's aquatic buttercup) | CNPS 4.2 | |
| <i>Trifolium [depauperatum] hydrophilum</i> (saline clover) | CNPS 1B.2 | |
| Serpentine/Ultramafic | | |
| <i>Arctostaphylos bakeri</i> ssp. <i>bakeri</i> (Baker's manzanita) | CR, CNPS 1B.1 | |
| <i>Arctostaphylos hispidula</i> (Howell's Manzanita) | CNPS 1B.1 | |
| <i>Arctostaphylos stanfordiana</i> ssp. <i>raichei</i> (Raiche's Manzanita) | CNPS 1B.1 | |
| <i>Asclepias solanoana</i> (serpentine milkweed) | CNPS 4.2 | |
| <i>Astragalus breweri</i> (Brewer's milk-vetch) | CNPS 4.2 | |
| <i>Calamagrostis ophitidis</i> (serpentine reed grass) | CNPS 4.3 | |
| <i>Calystegia collina</i> ssp. <i>oxyphylla</i> (Mt. Saint Helena morning-glory) | CNPS 4.2 | |
| <i>Collomia diversifolia</i> (serpentine collomia) | CNPS 4.3 | |
| <i>Cordylanthus tenuis</i> ssp. <i>brunneus</i> (serpentine bird's-beak) | CNPS 4.3 | |
| <i>Cordylanthus tenuis</i> ssp. <i>capillaries</i> (Pennell's bird's-beak) | FE, CR, CNPS 1B.2 | |
| <i>Cryptantha dissita</i> (serpentine cryptantha) | CNPS 1B.2 | |

| Scientific Name (Common Name) | Status | Comment |
|--|-------------------|----------------|
| <i>Cypripedium californicum</i> (California lady's-slipper) | CNPS 4.2 | |
| <i>Erigeron greenei</i> (Greene's narrow-leaved daisy) | CNPS 1B.2 | |
| <i>Erigeron serpentinus</i> (serpentine daisy) | CNPS 1B.3 | |
| <i>Erysimum franciscanum</i> (San Francisco wallflower) | CNPS 4.2 | |
| <i>Fritillaria liliacea</i> (Fragrant fritillary) | CNPS 1B.2 | |
| <i>Gilia capitata</i> ssp. <i>pacifica</i> (Pacific gilia) | CNPS 1B.2 | |
| <i>Gilia capitata</i> ssp. <i>tomentosa</i> (Woolly-headed gilia) | CNPS 1B.1 | |
| <i>Layia septentrionalis</i> (Colusa layia) | CNPS 1B.2 | |
| <i>Lessingia arachnoidea</i> (Crystal Springs lessingia) | CNPS 1B.2 | |
| <i>Lessingia hololeuca</i> (wholly-headed lessingia) | CNPS 3 | |
| <i>Sanguisorba officinalis</i> (great burnet) | CNPS 2B.2 | |
| <i>Sidalcea hickmanii</i> ssp. <i>viridis</i> (Marin checkerbloom) | CNPS 1B.3 | |
| <i>Streptanthus brachiatus</i> ssp. <i>hoffmanii</i> (Freed's jewel-flower) | CNPS 1B.2 | |
| <i>Streptanthus glandulosus</i> var. <i>hoffmanii</i> (Hoffman's bristly jewel-flower) | CNPS 1B.3 | |
| <i>Streptanthus morrisonii</i> ssp. <i>morrisonii</i> (Morrison's jewel-flower) | CNPS 1B.2 | |
| Locally Endemic / Outside Range | | |
| <i>Arctostaphylos bakeri</i> ssp. <i>sublaevis</i> (The Cedars manzanita) | CR, CNPS 1B.1 | Serpentine |
| <i>Arctostaphylos stanfordiana</i> ssp. <i>decumbens</i> (Rincon Ridge Manzanita) | CNPS 1B.1 | Serpentine |
| <i>Calochortus raichei</i> (The Cedars fairy-lantern) | CNPS 1B.1 | Serpentine |
| <i>Ceanothus confuses</i> (Rincon Ridge ceanothus) | CNPS 1B.1 | Serpentine |
| <i>Clarkia imbricate</i> (Vine Hill clarkia) | FE, CE, CNPS 1B | |
| <i>Lilium pardalinum</i> ssp. <i>pitkinense</i> (Pitkin Marsh lily) | FE, CE, CNPS 1B | |
| <i>Malacothamnus mendocinensis</i> (Mendocino bush-mallow) | CNPS 1A | Last seen 1938 |
| Mountainous/Rocky Xeric Uplands | | |
| <i>Amorpha californica</i> var. <i>napensis</i> (Napa false indigo) | CNPS 1B.2 | |
| <i>Arctostaphylos manzanita</i> ssp. <i>elegans</i> (Konocti manzanita) | CNPS 1B.2 | Volcanic soils |
| <i>Bryum chryseum</i> (brassy bryum) | CNPS 4.3 | |
| <i>Brodiaea leptandra</i> (narrow-anthered brodiaea) | CNPS 1B.2 | Volcanic soils |
| <i>Ceanothus foliosus</i> var. <i>vineatus</i> (Vine Hill ceanothus) | CNPS 1B.1 | |
| <i>Ceanothus gloriosus</i> var. <i>exaltatus</i> (glory brush) | CNPS 4.3 | |
| <i>Ceanothus purpureus</i> (Holly-leaved ceanothus) | CNPS 1B.2 | |
| <i>Cypripedium montanum</i> (mountain lady's-slipper) | CNPS 4.2 | |
| <i>Delphinium luteum</i> (Golden (yellow) larkspur) | FE, CR, CNPS 1B.1 | |
| <i>Epilobium septentrionale</i> (Humboldt County fuchsia) | CNPS 4.3 | |

Vegetation and Wildlife

| Scientific Name (Common Name) | Status | Comment |
|---|-------------------|-------------------------------|
| <i>Grimmia torenii</i> (Toren's grimmia) | 1B.1 | Boulder, rock walls, volcanic |
| <i>Kopsiopsis hookeri</i> (small groundcone) | CNPS 2B.3 | |
| <i>Leptosiphon jepsonii</i> (Jepson's leptosiphon) | CNPS 1B.2 | |
| <i>Lilium rubescens</i> (redwood lily) | CNPS 4.2 | |
| <i>Micropus amphiboles</i> (Mt. Diablo cottonweed) | CNPS 3.2 | |
| <i>Monardella viridis</i> (green monardella) | CNPS 4.3 | |
| <i>Usnea longissima</i> (Methuselah's beard lichen) | CNPS 4.2 | Upland forest |
| <i>Viburnum ellipticum</i> (oval-leaved viburnum) | CNPS 2B.3 | |
| Unique Habitat | | |
| <i>Delphinium bakeri</i> (Baker's larkspur) | FE, CE, CNPS 1B.1 | Decomposed shale |

¹These plant species have specialized habitat requirements such as vernal pools or soils derived from serpentine, volcanic material, or shale that do not occur in the project area. Many plant species have a very restricted range (i.e., locally endemic) or are not known to occur in the Russian River watershed or in the vicinity of the project area. Other plants only inhabit uplands in dry mountainous terrain or on exposed rock outcrops. These types of xeric habitats are not present in the project area. Also, many plants could be placed in more than one of the listed categories. For example, The Cedars is a mountainous region in northern Sonoma County with serpentine soils. Several plant species are local endemics to this area, only occur on serpentine soils, and in rocky dry areas.

CODES:

FE: Federally listed as Endangered

FT: Federally listed as Threatened

CE: State of California listed as Endangered

CT: State of California listed as Threatened

CR: State of California listed as Rare

CNPS = California Native Plant Society

1A: Presumed extinct in California

1B: Rare, Threatened, or Endangered in California and elsewhere

2: Rare, Threatened, or Endangered in California, but more common elsewhere

SOURCES: (CDFW, 2016a); (California Native Plant Society, 2016) (California Native Plant Society, 2016) (Baldwin, 2012) (USFWS, 2016b); (USFWS, 2016c)

Table 4.4- 4. Special Status Plant Species with Potential to Occur in the Fish Flow Project Area

| Common Name <i>Scientific Name</i> | Status | Phenology ^a | Flowering Period | Habitat | Potential to Occur |
|--|---------------------|----------------------------------|------------------|--|--|
| Blasdale's bent grass <i>Agrostis blasdalei</i> | CNPS 1B.2 | Perennial herb (rhizomatous) | May – Jul | Coastal bluff scrub, coastal dunes, and coastal prairie. Elevation 15 to 490 feet. | Low. Present at several locations along the Sonoma coast, nearest location less than ¼ mile south of Estuary project area. Vegetated sand dunes at Goat Rock State Beach may be suitable habitat, but outside of project area. |
| Franciscan onion <i>Allium peninsulare</i> var. <i>franciscanum</i> | CNPS 1B.2 | Perennial herb (bulbiferous) | May – Jun | Cismontane woodland and valley and foothill grassland associated with clay soil; often on serpentine. Elevation 170 to 980 feet. | Low. Present on roadside ocean cliffs approximately three miles north of Bodega Bay. No suitable habitat in the project area. |
| Sonoma alopecurus <i>Alopecurus aequalis</i> var. <i>sonomensis</i> | FE, CNPS 1B.1 | Perennial herb | May – Jul | Freshwater marshes and swamps and riparian scrub. Elevation 15 to 1,200 feet. | High. Present in Duncans Mills and Guerneville areas near or adjacent to the Russian River. Potential habitat present in Russian River project area. |
| Bolander's reed grass <i>Calamagrostis bolanderi</i> | CNPS 4.2 | Perennial herb (rhizomatous) | May – Aug | Bogs, upland forests, coastal scrub, and marshes. | Moderate. Reported from Camp Meeker area, but not known from the project area. Potential habitat may present along the Russian River project area. |
| Pink star-tulip <i>Calochortus uniflorus</i> | CNPS 4.2 | Perennial bulbiferous herb | Apr – Jun | Coastal prairie, coastal scrub, meadows and seeps, and North Coast coniferous forest | Low. Reported from Duncans Mills area but not known from the project area. Marginal habitat may present along the Russian River project area. |
| Coastal bluff morning-glory <i>Calystegia purpurata</i> ssp. <i>saxicola</i> | CNPS 1B.2 | Perennial herb | May – Sep | Coastal dunes, coastal scrub, and North Coast coniferous forest. Elevation 30 to 340 feet. | Low. Reported from Goat Rock State Beach and other Sonoma Coast sites. Vegetated dunes at Goat Rock State Beach may be suitable habitat, but outside of project area. |
| Swamp harebell <i>Campanula californica</i> | CNPS 1B.2 | Perennial herb (rhizomatous) | Jun – Oct | Bogs and fens, meadows and seeps, freshwater marsh and swamps, and mesic closed-cone coniferous forest, coastal prairie, and North Coast coniferous forest. Elevation 3 to 1,330 feet. | Moderate. Reported from Duncans Mills Marsh area, which is separate from the Russian River. Also, reported from Lake Sonoma area. Potential suitable habitat present at marshy edges along the project area. |

Vegetation and Wildlife

| Common Name Scientific Name | Status | Phenology ^a | Flowering Period | Habitat | Potential to Occur |
|---|----------------------------|---------------------------------|------------------|--|---|
| Sonoma white sedge <i>Carex albida</i> | FE, CE, CNPS 1B.1 | Perennial herb (rhizomatous) | May – Jul | Bogs and fens and freshwater marshes and swamps. Elevation 50 to 295 feet. | Low. Only known from Pitkin Marsh located three miles south of project area. |
| Bristly sedge <i>Carex comosa</i> | CNPS 2B.1 | Perennial herb (rhizomatous) | May – Sep | Margins of marshes, swamps, and wetland places. Elevation 0 to 2,050 feet. | Moderate. Historic report from 1896 from Guerneville area and from Hopland area. Potential habitat present along the Russian River project area. |
| Deceiving sedge <i>Carex saliniformis</i> | CNPS 1B.2 | Perennial herb (rhizomatous) | Jun | Coastal salt marshes and swamps, meadows and seeps, and mesic coastal prairie and coastal scrub. Elevation 10 to 755 feet. | Moderate. Reported near Russian Gulch and Meyers Grade, two miles north of Jenner. Potential habitat present in project area. |
| <i>Castilleja ambigua</i> var. <i>ambigua</i> (johnny-nip) | CNPS 4.2 | Annual herb | Mar – Aug | Coastal prairie, coastal scrub, marshes and seeps, and vernal pool margins | Low. Reported from Camp Meeker area but not known from the project area. Marginal habitat may present along the Russian River project area. |
| <i>Centromadia parryi</i> ssp. <i>Parryi</i> Pappose tarplant | CNPS 1B.2 | Shrub (evergreen) | Feb – Jun | Coastal prairie, meadows and seeps, coastal salt marsh, grasslands. Often alkaline wetlands. | Low. Known from Sonoma County Airport wetland mitigation area. Marginal habitat along Estuary and Russian River project area. |
| Sonoma spineflower <i>Chorizanthe valida</i> | FE, CE, CNPS 1B.1 | Annual herb | Jun – Aug | Sandy coastal prairie. Elevation 30 to 1,000 feet. | Low. May be extinct in Sonoma County. Coastal vegetated dunes at Goat Rock State Beach may be suitable habitat, but outside of project area. |
| <i>Entosthodon kochii</i> Koch's cord moss | 1B.3 | Perennial herb | | Cismontane woodland. Moss growing on soil along river banks. | Moderate. Reported from Hopland Field Station in 2002. Reported from Galbreath Wildlands Preserve, and Purdy's Garden Quad in Upper Russian River Watershed. Suitable habitat may be present in project area. |

| Common Name Scientific Name | Status | Phenology ^a | Flowering Period | Habitat | Potential to Occur |
|---|-----------|----------------------------|------------------|---|---|
| <i>Erigeron biolettii</i> Streamside daisy | CNPS 3 | Perennial herb | Jun - Sep | Broad-leave upland forest, woodland, coniferous forest in rocky mesic areas. | Low. Not known from project area. No suitable habitat in project area. Coastal scrub and prairie at Goat Rock State Beach may be suitable habitat, but outside of project area. |
| <i>Erysimum concinnum</i> bluff wallflower | CNPS 1B.2 | | | Coastal dunes, bluffs, and prairie. | Low. Report from Goat Rock State Beach 2012. No suitable habitat within project area. |
| <i>Erythronium revolutum</i> (coast fawn lily) | CNPS 2B.2 | Perennial bulbiferous herb | Mar - Aug | Mesic, streambanks, Bogs and fens, Broadleafed and upland forests. | Moderate. Reported from Duncans Mills area. Potential marginal habitat present at marshy edges along the project area. |
| <i>Fissidens pauperculus</i> minute pocket moss | 1B.2 | Perennial herb | | North coast coniferous forest. Moss grows on moist soils in and along stream banks. | Moderate. Reported from Russian Gulch north of Jenner in 1951. Reported from Duncans Mills. Potential marginal habitat present at marshy edges along the project area. |
| Blue coast gilia <i>Gilia capitata</i> ssp. <i>chamissonis</i> | CNPS 1B.1 | Annual herb | Apr – Jul | Coastal dunes and coastal scrub. Elevation 10 to 660 feet. | Low. Reported at several locations within ten miles of Estuary project area, including Goat Rock State Beach to Jenner (CNDDDB Occ. 29). Coastal scrub and vegetated dunes at Goat Rock State Beach may be suitable habitat, but outside of project area. |
| Congested-headed (Pale yellow) hayfield tarplant <i>Hemizonia congesta</i> ssp. <i>congesta</i> | CNPS 1B.2 | Annual herb | Apr - Nov | Valley and foothill grassland. Sometimes along roadsides. Elevation 70 to 1,840 feet. | Low. Historically documented from along State Route 1 approximately four miles north of Jenner, Santa Rosa Plain, and west of Warms Springs Dam. Marginal habitat in the project area. |
| Short-leaved evax <i>Hesperevax</i> <i>sparsiflora</i> var. <i>brevifolia</i> | CNPS 1B.2 | Annual herb | Mar – Jun | Coastal dunes and sandy coastal bluff scrub. Elevation 0 to 705 feet. | Low. Present at several locations along Sonoma Coast within five miles of Russian River mouth. Coastal vegetated dunes and bluffs at Goat Rock State Beach may be suitable habitat, but outside of project area. |

Vegetation and Wildlife

| Common Name Scientific Name | Status | Phenology ^a | Flowering Period | Habitat | Potential to Occur |
|---|-------------------------|------------------------------|------------------|--|---|
| Thin-lobed horkelia <i>Horkelia tenuiloba</i> | CNPS 1B.2 | Perennial herb | May – Jul | Broadleaved upland forest, chaparral, and valley and foothill grassland in mesic, sandy openings. Elevation 160 to 1,640 feet. | Low. Reported in vicinity of Bohemian Grove, approximately one mile south of project area. Suitable habitat generally not present in the project area. |
| <i>Iris longipetala</i> (coast iris) | CNPS 4.2 | Perennial herb (rhizomatous) | Mar - May | Coastal prairie, lower montane coniferous forest, and meadows and seeps | Low. Reported from Hopland and Camp Meeker areas. Marginal habitat may present along the Russian River project area. |
| Perennial goldfields <i>Lasthenia californica</i> ssp. <i>macrantha</i> | CNPS 1B.2 | Perennial herb | Jan – Nov | Coastal dunes, coastal bluff scrub, and coastal scrub. Elevation 20 to 1,710 feet. | Low. Reported in 1931 in the vicinity of the Russian River mouth (CNDDDB Occ. 33). Coastal scrub and vegetated dunes at Goat Rock State Beach may be suitable habitat, but outside of Estuary project area. |
| <i>Limnanthes bakeri</i> Baker's meadowfoam | SR, CNPS 1B.1 | Annual herb | Apr - May | Freshwater marshes, grasslands, meadows and seeps, and vernal pools. Prefers seasonally moist or saturated soils. | Moderate. Reported within ½ mile of Russian River in Ukiah. Potential habitat in Russian River project area. |
| <i>Hosackia gracilis</i> (harlequin lotus) | CNPS 4.2 | Perennial herb (rhizomatous) | Mar - Jul | Wetlands, roadsides, upland forest, coastal scrub and prairie, valley and foothill grassland | Moderate. Reported from Duncans Mills area. Potential marginal habitat present at marshy edges along the project area. |
| Tidestrom's (clover) lupine <i>Lupinus tidestromii</i> | FE, CE, CNPS 1B.1 | Perennial herb (rhizomatous) | Apr – Jun | Coastal dunes. Elevation 0 to 330 feet. | Low. Reported on vegetated sand dunes at Goat Rock State Beach, but no suitable habitat within the Estuary project area. |
| North Coast semaphore grass <i>Pleuropogon</i> <i>hooverianus</i> | ST CNPS 1B.1 | Perennial herb (rhizomatous) | Apr – Jun | Meadows and seeps and mesic openings in broadleaved upland forest and North Coast coniferous forest. Elevation 30 to 2,200 feet. | Moderate. Reported from the Freestone area seven miles south of the Russian River and near Ukiah three miles from the Russian River. Potential habitat present in project area. |

| Common Name Scientific Name | Status | Phenology ^a | Flowering Period | Habitat | Potential to Occur |
|---|--------------------|---------------------------------|------------------|--|--|
| Point Reyes checkerbloom <i>Sidalcea calycosa</i> ssp. <i>rhizomata</i> | CNPS 1B.2 | Perennial herb (rhizomatous) | Apr – Sep | Freshwater marshes and swamps near the coast. Elevation 10 to 250 feet. | Moderate. Historic 1882 report from the Duncans Mills area. Potential habitat present in the project area. |
| Purple-stemmed checkerbloom <i>Sidalcea malviflora</i> ssp. <i>purpurea</i> | CNPS 1B.2 | Perennial herb (rhizomatous) | May – Jun | Broadleaved upland forest and coastal prairie. Elevation 0 to 100 feet. | Low. Reported from several locations along the Sonoma Coast, including Goat Rock State Beach, but no suitable habitat within the project area. |
| <i>Tracyina rostrata</i> Beaked tracyina | CNPS 1B.2 | Annual herb | May - Jun | Oak Woodland and grasslands. Elevation 200 to 1,500 feet. | Low. Reported from Hopland area two miles from the Russian River in a pasture. Marginal habitat in the project area. |
| Showy Rancheria (two-fork) clover <i>Trifolium amoenum</i> | FE CNPS 1B.1 | Annual herb | Apr – Jun | Coastal bluff scrub and valley and foothill grassland. Sometimes on serpentine soil. Elevation 20 to 1,360 feet. | Low. Reported from the Freestone and Bodega Bay areas. Suitable soils and habitat not generally present in the project area. |

^a Phenology is the study of periodic occurrences in nature, such as the ripening of fruit, and their relation to climate.

CODES:

FE: Federally listed as Endangered

FT: Federally listed as Threatened

CE: State of California listed as Endangered

CT: State of California listed as Threatened

CR: State of California listed as Rare

CNPS = California Native Plant Society

1A: Presumed extinct in California

1B: Rare, Threatened, or Endangered in California and elsewhere

2: Rare, Threatened, or Endangered in California, but more common elsewhere

POTENTIAL TO OCCUR

Unlikely = Habitat not present in the Estuary Study Area and/or species is not known to occur in the Estuary Study Area based on CNDDDB occurrences, recent field surveys or species distribution information.

Low = Habitat not present in the Estuary Study Area and/or few occurrence in the region.

Moderate = Marginal habitat present in the Estuary Study Area and/or some occurrences in the region.

High = Good habitat present in the Estuary Study Area and nearby occurrences or species is known to occur in the Estuary Study Area based on CNDDDB occurrences or recent field surveys.

SOURCES: (CDFW, 2016a); (California Native Plant Society, 2016) (California Native Plant Society, 2016) (Baldwin, 2012) (USFWS, 2016b); (USFWS, 2016c)

Vegetation and Wildlife

Sonoma Alopecurus

Sonoma alopecurus (*Alopecurus aequalis* var. *sonomensis*) is a federally-listed endangered and CNPS List 1B.1 species. This perennial herb is a member of the grass family (Poaceae). It produces short, compact inflorescences during its May to July blooming season. Spikelets are usually violet-gray at the tip. Sonoma alopecurus occurs in freshwater marshes and swamps and riparian scrub habitats between 15 and 1,200 feet in elevation. It is a California endemic species that is known from Sonoma and Marin counties. Eleven populations have been extirpated and eight natural populations are believed extant.

The freshwater marsh that occurs sporadically along the edges of the Russian River may provide suitable habitat for Sonoma alopecurus. This plant is known to occur within Duncans Mills Marsh, less than 0.25 mile from the project area. It is also known from Guerneville Marsh near the Highway 116 Bridge, adjacent to the Russian River. Generally, this species is found in low energy environments, at lake margins, in bogs, fens, and swamps, implying habitat supported by seeps, springs, and/or slow moving or stagnant water. Suitable habitat along the Russian River regularly experiences inundation and flow velocities that would be anticipated to preclude their presence. There are several other occurrence records for this species in Sonoma County in marshes near Kenwood, Freestone, Occidental, and Forestville. There is a moderate potential for this species to occur within the Russian River project area due to the presence of suitable habitat and proximity to known populations.

Bolander's Reed Grass

Bolander's reed grass (*Calamagrostis bolanderi*) is a CNPS List 4.2 species in the grass family (Poaceae). It is endemic to California in Sonoma, Mendocino, and Humboldt counties. It is known to grow at elevations from sea level to around 600 feet. This grass is a perennial herb with rhizomatous roots and blooms from June to August. This species occurs in bogs and fens, closed-cone coniferous forest, coastal scrub, meadows and seeps, freshwater marshes and swamps, and wet areas within coniferous forest.

The freshwater marsh that occurs sporadically along the edges of the Russian River may provide suitable habitat for the Bolander's reed grass. There are several known occurrences along the Sonoma Coast and inland at Pitkin Marsh and Cunningham Marsh in Sonoma County. Generally, this species is found in low energy environments, at lake margins, in bogs, fens, and swamps, implying habitat supported by seeps, springs, and/or slow moving or stagnant water. Suitable habitat along the Russian River regularly experiences inundation and flow velocities that would be anticipated to preclude their presence. Based on the known occurrence of this grass in the project vicinity and suitable habitat along the edges of the Russian River, there is a low potential for this species to occur within the project area.

Swamp Harebell

Swamp harebell (*Campanula californica*) is a CNPS List 1B.2 perennial species in the bellflower family (Campanulaceae). It is endemic to California and extant in Marin, Sonoma, and Mendocino counties, with historical occurrences in Santa Cruz County. It is known to grow at elevations between 3 and 1,330 feet. This harebell is a perennial rhizomatous herb that produces pale blue, bell-shaped flowers during its June to October blooming period. Swamp harebell occurs within wetland areas such as bogs and fens, meadows and seeps, freshwater marsh and swamps and can also be found in wetter portions of coastal prairie and closed-cone coniferous forest.

The swamp harebell is known from Duncans Mills Marsh, which is located approximately 0.25 miles north of the Russian River. Freshwater marsh occurs along the edges of the Russian River Estuary including at the confluence of Willow Creek. Other freshwater marsh occurs sporadically along the mainstem of the Russian River. Suitable habitat along the Russian River regularly experiences inundation and flow velocities that would be anticipated to preclude the presence of swamp harebell. The species is not generally known to occur in habitat inundated and/or affected by high winter flows and so is not expected to be present in the project area. However, there is a low potential for this species to occur within the project area due to the presence of suitable habitat and known occurrences within the vicinity.

Bristly Sedge

Bristly sedge (*Carex comosa*) is a CNPS List 2.1 species. It is a rhizomatous herb of the sedge family (Cyperaceae) that occurs in marshes and swamps in elevations ranging from 0 to 2,050 feet. Bristly sedge can also occur along lake margins and in valley and foothill grassland. The plant is closely associated with coastal prairie. Bristly sedge is fairly widely distributed, but apparently rarely reported. In California bristly sedge is known from Contra Costa, Lake, Mendocino, Sacramento, San Bernardino, Santa Cruz, San Francisco, San Mateo, Shasta, San Joaquin, and Sonoma counties. It has also been found in Oregon, Washington, Idaho, and elsewhere. The blooming period for bristly sedge is from May to September.

Generally, this species is found in low energy environments, at lake margins, in bogs, fens, and swamps, implying habitat supported by seeps, springs, and/or slow moving or stagnant water. The project area contains sparse patches of marsh and grassland, which are potential habitat for the bristly sedge but likely experience inundation and flow velocities that would preclude their presence. The closest record for this species to the project area is a historical occurrence from 1896 in the vicinity of Guerneville. Another occurrence record is approximately six miles southeast of the Estuary project area near Bodega Bay, but the record lacks detail on the collection date. Based on marginal habitat and an historic occurrence near the Russian River, the bristly sedge has a low potential to occur within the project area.

Deceiving Sedge

Deceiving sedge (*Carex saliniformis*) is a CNPS List 1B.2 species of the sedge family (Cyperaceae). It grows in mesic coastal prairie and scrub, coastal salt marshes and swamps, and meadows and seeps between 10 and 755 feet in elevation. Its range extends along coastal northern California in Humboldt, Mendocino, and Sonoma counties and is believed extirpated from Santa Cruz County. This perennial, rhizomatous herb blooms in June and less commonly in July.

The project area in the Estuary contains seasonal wetlands, which may provide suitable habitat for the deceiving sedge. There is one known occurrence record for the deceiving sedge within ten miles of the Estuary. The exact location of this record is unknown, but it is within the vicinity of Meyers Grade and Russian Gulch, between Highway 1 and the Pacific Ocean, approximately one mile northwest of the Russian River mouth. Deceiving sedge has a moderate potential to occur within the Estuary reach of the project area, given the presence of suitable habitat and proximity to an occurrence record.

Koch's cord moss

Koch's cord moss (*Entosthodon kochii*) is a CNPS List 1B.3 bryophyte (a species of moss) in the moss family Funariaceae. The species is a California endemic known from cismontane woodland in San Luis

Vegetation and Wildlife

Obispo, Marin, Mariposa, and Mendocino counties. The species is not well known and there are four occurrences in the CNDDDB, each a single reported occurrence from the counties mentioned above. Occurrences are associated with riverbanks on newly exposed soils at moderate elevations. Newly exposed and scoured streambanks are present throughout most if not all of the Russian River. Koch's cord moss has a moderate potential to occur in the Russian River project area. As flow changes may result in a slight stage change (2-3 inches), the project could result in additional habitat for this species to colonize following spring drawdowns.

Coast fawn lily

Coast fawn lily (*Erythronium revolutum*) is a CNPS List 2B.2 perennial bulb in the lily family (Liliaceae). Coast fawn lily is found widely along the Pacific coast from southern British Columbia to north western California. The species has paired, broadly lanceolate, basal leaves with irregular brownish green blotches, and produces one to three pinkish purple nodding flowers March to July. The species prefers high precipitation areas within 100 miles of the coast; in moist soil in open or moderately shaded coastal forests and can be found on streambanks. Suitable habitat along the Russian River regularly experiences inundation and flow velocities that would be anticipated to preclude the presence of swamp harebell. The species is not generally known to occur in areas affected by high winter flows and so is not expected but has a moderate potential to occur in the project area.

Minute pocket moss

Minute pocket moss (*Fissidens pauperculus*) is a CNPS List 1B.2 bryophyte (a species of moss) in the moss family Fissidentaceae. This species was listed as endangered in British Columbia in 2001. It is a North American endemic found in Pacific states but restricted to western portions of California, Oregon, Washington, and Southwestern British Columbia. Habitat where this species has been observed includes bare, seasonally moist soil banks (or logs) with hard packed silt rich soils on steep faces in heavily shaded forested habitats or logs (Poor Pocket Moss Recovery Team, 2001). The species forms loosely gregarious small patches on compacted soils. In California the species appears most frequently on soil in redwood forests. Because redwood forest occurs above the limit of the project area, minute pocket moss has a low potential to occur in the project area.

Baker's Meadowfoam

Baker's meadowfoam (*Limnanthes bakeri*) is state-listed as rare and a CNPS List 1B.1 species. It is an annual herb in the meadowfoam family (Limnanthaceae) and blooms from April to May. This plant grows in seasonally wet places such as the margins of freshwater marshes, grasslands, meadows, seeps, and vernal pools. It occurs in the inland areas of Mendocino County. Generally, this species is found in low energy environments at wetland margins in habitat supported by seeps, springs, and/or slow moving water.

The margins of the Russian River may contain seasonal wetlands, which may provide suitable habitat for Baker's meadowfoam. The project area contains sparse patches of marsh and grassland, which are potential habitat for the Baker's meadowfoam but likely experience inundation and flow velocities that would preclude its presence. The most southerly report of this plant is from a vernal pool and drainage in Ukiah that drains to the Russian River, approximately 0.5 mile to the west. However, this site was developed in 1993 and the population of Baker's meadowfoam is now extirpated. Baker's meadowfoam has a moderate potential to occur within the Russian River mainstem project area, given the presence of suitable habitat and proximity to an occurrence record in Ukiah Valley.

Harlequin lotus

Harlequin lotus (*Hosackia gracilis*) is a CNPS List 4.2 perennial herb in the pea family (Fabaceae). It is native to western North America from British Columbia to California as far south as San Luis Obispo County, where it grows in coastal mountains and oceanside bluffs. Flowers can be produced January to September, and are pea-shaped, bicolor usually with a yellow upper petal and pink or white lower petals. The freshwater marsh that occurs sporadically along the edges of the Russian River may provide suitable habitat for the harlequin lotus. This plant is known to occur within Duncans Mills Marsh, less than 0.25 mile from the project area. Other freshwater marsh occurs sporadically along the mainstem of the Russian River. There is a moderate potential for this species to occur within the project area due to the presence of suitable habitat and known occurrences within the vicinity.

North Coast Semaphore Grass

North Coast semaphore grass (*Pleuropogon hooverianus*) is state-listed as threatened and CNPS List 1B.1 species and member of the grass family (Poaceae). This rhizomatous perennial grass grows in meadows and seeps and within mesic openings in broadleaved upland forest and North Coast coniferous forest. Generally, this species is found in low energy environments, at lake margins, in bogs, fens, and swamps, implying habitat supported by seeps, springs, and/or slow moving or stagnant water, not high energy streams like the Russian River or Dry Creek. Its range includes Mendocino, Sonoma, and Marin counties at elevations between 30 and 2,200 feet. The blooming period for this grass extends from April through June.

The Russian River mainstem of the project area may contain small areas of grassland that fringe the riparian zone, which provide potential habitat for the North Coast semaphore grass, but these likely experience inundation and flow velocities that would preclude the presence of the grass. There is an occurrence record for this species approximately seven miles south of the Russian River near Freestone. Plants were observed within a ditch in 1974, but may have been extirpated by road creation. Another report is from south of Ukiah approximately three miles from the Russian River. There is a moderate potential for the North Coast semaphore grass to occur within the Russian River mainstem project area due to the presence of potential habitat and records in the vicinity of the Russian River.

Point Reyes Checkerbloom

Point Reyes checkerbloom (*Sidalcea calycosa* ssp. *rhizomata*) is a CNPS List 1B.2 species of the mallow family (Malvaceae). This perennial, rhizomatous herb produces pale purple flowers during its blooming period, which occurs April through September. It can be found in coastal freshwater marshes and swamps between 10 and 250 feet in elevation. Its range extends from Mendocino County south to Marin County.

The project area contains freshwater marsh along the edges of the Russian River mainstem and Estuary within the coastal zone, which is potential habitat for the Point Reyes checkerbloom. Similar to several wetland plant species described above, this checkerbloom is also found in low energy environments, at lake margins, in bogs, fens, and swamps, implying habitat supported by seeps, springs, and/or slow moving or stagnant water, not high energy rivers like the Russian. There is one historic record for this species within project vicinity. This record is from an 1882 in the vicinity of Duncans Mills Marsh, less than 0.25 miles north of the upper Estuary project area. Although this checkbloom has not been reported for over a century, it has a low potential to occur within the project area based on the presence of potential habitat and occurrence record near the Estuary.

Special-Status Animals

Based on review of databases and other information sources, 49 special-status animal species have been identified as occurring or potentially occurring in the vicinity of the project area (Table 4.4.5). Twenty-two of these special-status animal species are considered unlikely to occur or to have a low potential to visit in the project area for reasons such as absence of essential habitat required for the species, the distance to known occurrences and/or the species distributional range. These species are listed on Table 4.4.5 and not discussed further in this section. The remaining 27 special-status animal species are considered to have moderate to high potential to occur within the project area based on occurrences, known range, or availability of suitable habitat. These species are discussed below.

Table 4.4-5. Special Status Wildlife Species with Potential to Occur in the Vicinity of the Fish Flow Project¹

| Scientific Name Common Name | Legal Status ² | Habitat | Nearest Documented Occurrence ³ and Potential Presence in Project Area |
|---|---------------------------|--|---|
| Invertebrates | | | |
| <i>Bombus caliginosus</i> Obscure bumble bee | SA | Food plant species include several upland shrubs and forbs. | Low. Reported from Hopland, Cloverdale, and Guerneville areas from 1963 to 1982. No suitable habitat within the project area. |
| <i>Bombus occidentalis</i> Western bumble bee | SA | Nests in colonial hives. Forages on a variety of flower types for pollen. | Low. Reported from Goat Rock State Beach in 1963, Willow Creek area in 1979, and other coastal areas south of the Russian River. May infrequently forage or nest in the project area, but not dependent on aquatic or wetland habitats. |
| <i>Callophrys mossii bayensis</i> San Bruno elfin butterfly | FE | Inhabits rocky outcrops and cliffs in coastal scrub on the San Francisco Peninsula. Host plant is the Broadleaf Stonecrop (<i>Sedum spathulifolium</i>). | Unlikely. Outside of known range and no suitable habitat in the project area. |
| <i>Dubiraphia giulianii</i> Giuliani's dubiraphian riffle beetle | SA | Aquatic. Found in the slow part of the Russian River. Inhabits rocks and vegetation. | Moderate. Reported from the Russian River near Rio Nido in 1948. There are no recent reports. Status of this beetle in the project area is unknown. |
| <i>Linderiella occidentalis</i> California linderiella | SA | Vernal pools and other seasonal wetlands in grasslands underlain by hardpan or impervious layer. | Unlikely. Known from vernal pools on the Santa Rosa Plain, Sonoma County. No suitable habitat in the project area. |
| <i>Speyeria zerene behrensii</i> Behren's silverspot butterfly | FE | Restricted to the Pacific side of the Coast Ranges from Point Arena to Cape Mendocino. Inhabits coastal prairie terrace habitat. Food plant is violet. | Low. Nearest recorded occurrence is in Mendocino County. No potential habitat within the project area. Species unlikely to occur in project area. |
| <i>Speyeria zerene myrtleae</i> Myrtle's silverspot butterfly | FE | Coastal dunes, coastal terrace, coastal bluff scrub and associated coastal dunes/grasslands in Sonoma and Marin counties. Larvae have a single host, western dog violet (<i>Viola adunca</i>). | Low. Reported from Goat Rock State Beach south of the Russian River mouth. No dune vegetation occurs within the project area; hence no suitable habitat in the project area. |

Vegetation and Wildlife

| Scientific Name Common Name | Legal Status² | Habitat | Nearest Documented Occurrence³ and Potential Presence in Project Area |
|---|---------------------------------|---|---|
| <i>Syncaris pacifica</i> California freshwater shrimp | FE, SE | Perennial creeks with slow flows and developed bank vegetation. Needs deep undercut banks with exposed roots for winter refugia. | Unlikely. Several occurrences in tributaries of the Russian River, including Green Valley, Austin, and Blucher creeks. Not known to occur in larger streams including the Russian River and Dry Creek. No suitable habitat in Lake Sonoma and Mendocino. Species unlikely to occur in project area. |
| Amphibians | | | |
| <i>Ambystoma californiense</i> California tiger salamander | FE, ST | Grasslands and valley foothill woodland habitats with appropriate subterranean refuge sites (burrows). Breeds in fishless vernal pools and seasonal ponds. | Unlikely. Several occurrences on the Santa Rosa Plain in the vicinity of Santa Rosa to Cotati. No records in the project area. No suitable habitat in the Russian River or Lakes Sonoma and Mendocino due to an abundance of predatory fish. |
| <i>Rana draytonii</i> California red-legged frog | FT, CSC | Creeks, ponds, and marshes with permanent or temporary water bordered by emergent or riparian vegetation. Requires 4-6 months of permanent water for larval development. | Moderate. Reported occurrences from tributaries and ponds in the lower Russian River area. No reports from the Russian River mainstem or Lakes Sonoma and Mendocino. |
| <i>Dicamptodon ensatus</i> California giant salamander | CSC | Adults prefer damp coniferous forests near streams. Adults breed in perennial mountainous streams with rocky substrate. Larvae are aquatic for one or more years. Occasionally occurs in lakes and ponds, but usually at higher elevations. | Moderate. Several reports from Russian River tributaries from Jenner to Cloverdale area. May occasionally occur in higher gradient sections of the Russian River and Dry Creek project area. |
| <i>Rana boylei</i> Foothill yellow-legged frog | CSC, PN | Moderate to high gradient streams with gravel to cobble substrate. Breeds in areas with slower moving water. Tadpoles use rocky shallow creek margins for cover and grazing. | High. Reported in the Russian River from Ukiah to Duncans Mills. Several reports from tributaries of the Russian River. |
| Reptiles | | | |
| <i>Actinemys (Emys) marmorata</i> Western pond turtle | CSC, PN | Streams, ponds, and lakes. Upland nesting sites are typically unshaded, south facing slopes with soils of high clay or silt composition. | High. Known from several occurrences in the Russian River, Dry Creek, and Lake Sonoma. Lake Mendocino provides suitable habitat. |
| Birds | | | |
| <i>Accipiter cooperii</i> Cooper's hawk (nesting) | SA | Occurs in most wooded portions of California, except alpine regions. Usually found in areas with dense tree cover. Nests in deciduous trees. | High. Occurs throughout most of wooded areas of the Russian River watershed. Likely forages and nests in riparian and other wooded habitats in the project area. |
| <i>Ammodramus savannarum</i> Grasshopper sparrow | CSC | Dense grasslands in rolling hills and plains. | Unlikely. Reported from near Hopland. No suitable habitat in project area. |

| Scientific Name Common Name | Legal Status² | Habitat | Nearest Documented Occurrence³ and Potential Presence in Project Area |
|---|---------------------------------|--|---|
| <i>Aquila chrysaetos</i> Golden eagle (nesting and wintering) | FP | Occurs throughout California in rolling foothills, mountains, and deserts. Nests on cliffs and large trees in open areas. | Moderate. No records from the project area. However, this eagle may forage in open woodlands in the project area and may nest in large trees in the project area. |
| <i>Agelaius tricolor</i> Tricolored blackbird | CSC | Colonial nests located over or near freshwater, especially in emergent wetland. Usually nests in dense cattails or tules. Also, may nest in thickets of willow, blackberry, wild rose, and tall herbs. | Moderate. Reported from a pond near Hopland in 1990. Potential marginal habitat along Russian River project area. Unlikely at Lakes Sonoma and Mendocino and Dry Creek due to limited marsh vegetation. |
| <i>Ardea alba</i> Great egret (nesting colony) | SA | Common shorebird that occurs throughout California, except mountain and desert regions. Feeds along shorelines of lakes, estuaries, streams, and in pastures and farmlands. Nests in colonies in large trees usually near water. | High. Known to occur throughout the Russian River watershed. Likely forages within the project area. Likely nests in tall trees along the Russian River Estuary. |
| <i>Ardea herodias</i> Great blue heron (nesting colony) | SA | Colonial nester in tall trees. Forages in marshes, margins of waterways, and uplands. | High. Reported nesting along the Russian River in Alexander Valley and near Duncans Mills. Likely forages throughout Russian River, Dry Creek, and Lakes Sonoma and Mendocino project area. |
| <i>Athene cunicularia</i> Burrowing owl | CSC | Forages in grasslands, prairies, and open areas. Nests underground in mammal burrows, particularly California ground squirrel. | Low. Reported from Geyserville area in Alexander Valley. Not known to breed in Sonoma County, but is a winter visitor. Unlikely to occur in project area due to upland habitat requirements. |
| <i>Brachyramphus marmoratus</i> Marbled murrelet | FT | This coastal seabird from the North Pacific nests in old-growth coniferous forests. Foraging occurs in open ocean for small fish. | Unlikely. No old-growth forest or Critical Habitat within the Project area. Unlikely to nest or forage in the project area. |
| <i>Charadrius alexandrinus nivosus</i> Western snowy plover | FT | This species breeds on sandy coasts and brackish inland lakes, and is uncommon in freshwater. | Unlikely. No Critical Habitat Designation along the Sonoma Coast. May forage on Sonoma Coast beaches; however, no records within the Project Area. No suitable nesting habitat and unlikely to occur in the project area. |
| <i>Cerorhinca monocerata</i> Rhinoceros auklet (nesting colony) | CSC | Winter migrant to Northern California coastal waters. Forages for small fish in the open ocean. Nests on off shore islands and rocks. | Unlikely. Reported offshore at Arched Rock, Goat Rock State Beach. No suitable habitat in the project area. |
| <i>Circus cyaneus</i> Northern harrier (nesting) | CSC | Marshes, meadows, grasslands, and cultivated fields. Nests on ground commonly near low shrubs, in tall weeds or reeds. | High. Suitable habitat present in Estuary project area. |

Vegetation and Wildlife

| Scientific Name Common Name | Legal Status² | Habitat | Nearest Documented Occurrence³ and Potential Presence in Project Area |
|--|---------------------------------|--|---|
| <i>Coccyzus americanus</i> Yellow-Billed Cuckoo | FT | Requires patches of at least 25 acres of dense riparian forest with a canopy cover of at least 50 percent in both the understory and overstory; nests typically in mature willows. | Low. A single cuckoo was observed in Bodega Head in 2014, located 9 miles south of the Estuary. The project area is located outside the normal breeding range for this species; may occur as an infrequent transient. |
| <i>Dendroica petechial</i> Yellow warbler | CSC | A migrant and summer resident in northwestern California, occupying riparian vegetation in close proximity to water along streams and wet meadows. | High. Several occurrences in the project vicinity (USGS, 2016). Riparian areas in the project area provide suitable habitat. |
| <i>Elanus leucurus</i> White-tailed kite | FP | Forages in grasslands, open woodlands, agricultural fields, and marshes. Nests in trees with dense foliage. | High. Reported from Healdsburg and Guerneville areas. May nest in trees and occasionally forage in the project area. |
| <i>Falco peregrines</i> Peregrine falcon (nesting) | FP | Ranges throughout most of California. Forages in grassland, rangeland, and other open habitats. Nests on cliffs, escarpments, and rock outcrops. | High. Nests near Lake Sonoma, but unlikely to nest in project area. May infrequently hunt over the project area. |
| <i>Fratercula cirrhata</i> Tufted puffin | CSC | Forages in open ocean and nests on coastal islands and cliffs. | Unlikely. Reported offshore at Arched Rock, Goat Rock State Beach in 1979. However, no suitable habitat in the project area. |
| <i>Haliaeetus leucocephalus</i> Bald eagle | SE, FP | Occurs throughout California, except desert regions. May be resident in northern California. Forages primarily in large water bodies. Nests in large trees. | High. Known to nest and forage at Lake Sonoma. Observed foraging along the Russian River in Alexander Valley, Lake Mendocino, and Estuary. Likely a winter visitor to the Russian River and Lake Mendocino. |
| <i>Icteria virens</i> Yellow-breasted chat | CSC | Fairly common summer resident in California below 5,000 feet elevation. Occupies early successional riparian habitats with a well-developed shrub layer and open canopy. | High. A few occurrences in the project vicinity (USGS, 2016). Riparian areas in the project area provide suitable habitat. |
| <i>Phalacrocorax auritus</i> Double-crested cormorant (nesting colony) | SA | Occurs along the coast, estuaries, inland lakes, and rivers. Dives from the surface for fish. Nests colonially in large trees, rock ledges, and other secure sites. | High. Observed in the Russian River and Estuary. Reported nesting colony in 1979 on offshore rocks near the Russian River mouth. Likely forages throughout broader sections of the Russian River and Lakes Sonoma and Mendocino project area. |
| <i>Lanius ludovicianus</i> Loggerhead shrike | CSC | Present year round in most of California range. Occurs in shrublands and open woodlands. Requires hunting perches and sites with thorns of barbed wire to impale prey. | Moderate. Known northern California coastal range extends into coastal prairie and open oak woodlands in Sonoma County. |

| Scientific Name Common Name | Legal Status² | Habitat | Nearest Documented Occurrence³ and Potential Presence in Project Area |
|---|---------------------------------|--|--|
| <i>Pandion haliaetus</i> Osprey (nesting) | SA | Occurs in ponderosa pine and mixed conifer habitats along sea coasts, lakes, and rivers. Foraging (fishing) areas require large snags and open trees near large, clear, open water. | High. Several nesting reports along the Russian River, Estuary, and in the vicinity of Lake Mendocino. Likely nests and forages along the Russian River and Lakes Sonoma and Mendocino. |
| <i>Pelecanus erythrorhynchos</i> American white pelican (nesting colony) | CSC, FP | Occurs in California large lakes, estuaries, San Francisco Bay and Salton Sea. Nearest nesting is in Klamath basin near Oregon border. Forages for fish by diving or scooping. | High. Observed foraging in the Russian River Estuary. May visit Lakes Sonoma and Mendocino. Does not nest in region. |
| <i>Pelecanus occidentalis californicus</i> California brown pelican | FE, FP | Found in marine and estuarine waters along the California coast. Forages for anchovy and other fish in open water. Rarely found in freshwater. Nests on Channel Island in Southern California. | High. Commonly observed foraging and resting in the Russian River Estuary project area. No nesting habitat in the project area. |
| <i>Riparia riparia</i> Bank swallow | ST | Colonial nester in vertical banks and cliffs next to water. | Low. One report near Jenner along the Russian River from 1960. No recent observations in the project vicinity. Unlikely to occur in the project area, based on historic record. |
| <i>Strix occidentalis caurina</i> Northern spotted owl | FT | Old growth forests or mixed stands of old growth and mature trees. High, multistory canopy dominated by big trees, many trees w/cavities or broken tops, woody debris, and space under canopy. | Low. No reports from the project area, but likely uses mature forests in the vicinity. May be infrequent visitor to the project area. |
| Mammals | | | |
| <i>Antrozous pallidus</i> Pallid bat | CSC | Forages in a variety of habitats. Roosts in caves, crevices, mines, and occasionally hollow trees and buildings. Prefers mesic sites. | Moderate. Reported from the Russian River vicinity. All records are from buildings. Riparian areas and bridges in the project area potential foraging and roosting habitat. |
| <i>Arborimus pomo</i> Sonoma tree vole | CSC | Old growth and other forests, mainly Douglas-fir, redwood, and montane hardwood-conifer habitats along the coast from Sonoma County north to the Oregon border. Restricted to the fog belt. Eats almost exclusively Douglas fir needles. | Low. Reported in the Russian River watershed, mainly in coastal areas. Report from Jenner area. However, no suitable habitat within the project area. |
| <i>Arctocephalus townsendi</i> Guadalupe fur seal | FT, MMA | Found in shallow rocky nearshore island waters of western Baja. Hunted to extinction in California by the 1820s. Only known breeding colony on Guadalupe Island, Baja Mexico. Rarely observed in California. | Low. There are a few reports of strandings from the North and Central Coast of California (TMMC, 2016). May be a rare visitor to the Sonoma Coast; however, unlikely to occur in the Estuary project area. |

Vegetation and Wildlife

| Scientific Name Common Name | Legal Status² | Habitat | Nearest Documented Occurrence³ and Potential Presence in Project Area |
|---|---------------------------------|---|---|
| <i>Corynorhinus townsendii</i> Townsend's big-eared bat | SC | Occurs throughout most of California in mesic sites. Roosts in the caves, mines, tunnels, buildings, etc. Extremely sensitive to human disturbance. | Moderate. Five records from Guerneville, Healdsburg, and Hopland from 1946 to 1987. No records within the project area. Bridges over the Russian River may provide roosting habitat. |
| <i>Eumetopias jubatus</i> Steller (northern) sea lion | FT, MMA | Occurs along the North Pacific coast from Alaska to central California. Forages for fish primarily in between intertidal zone and continental shelf. Prefers rocky haulouts along coast. Also, occasionally enters estuarine environments. | Low. Not known to occur at the Russian River mouth or Estuary (SCWA & Stewards, 2016) |
| <i>Lasiurus blossevillii</i> Western red bat | CSC | Occurs throughout most of central and southern California, except alpine and desert regions. Roosts in trees and forages in a variety of open habitats. | Moderate. Reported from Guerneville area at a rock quarry in 2003 and Alexander Valley in 1954. Riparian trees in project area may provide roosting habitat. |
| <i>Lasiurus cinereus</i> Hoary bat | CSC | Occurs throughout most of California, except desert regions. Prefers open habitat or habitat edges for foraging. Roosts in dense foliage in medium to large trees. | Moderate. Reported from Guerneville area in 1913 and Forestville in 1948. No recent reports. Riparian trees in project area may provide roosting habitat. |
| <i>Martes (Pekania) pennanti</i> Pacific martin (fisher) | FC, SC, CSC | Occurs in mixed evergreen forests in mountainous areas. Needs large areas of mature dense forest or riparian. | Unlikely. Nearest record from Lake County near Scott Creek from 1941. Not known from the Russian River area. Unlikely to occur in the project area due to lack of habitat. |
| <i>Mirounga angustirostris</i> Northern elephant seal | MMA | Occurs in the Eastern Pacific Ocean. Seals come ashore to breed, give birth, and molt, mostly on offshore islands. They feed on fish and squid in the deep open ocean. | Moderate. Individual elephant seals occasionally visit the Russian River mouth. The last observation was a sub-adult in 2014. |
| <i>Phoca vitulina</i> Harbor seal | MMA | Found in coastal waters of the northern Atlantic and Pacific Oceans. A common pinniped in California. Feeds on fish in coastal waters and estuaries. Uses beaches and rocks as resting haulouts. Birth of pups occurs in spring usually on beaches. | High. Harbor seals commonly haulout at the Russian River mouth (Jenner haulout) and forage in the Estuary and in freshwater upstream. Jenner haulout is largest in Sonoma County and females give birth to pups on the beach during spring. |
| <i>Taxidea taxus</i> American badger | CSC | Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. | Low. Known from several occurrences in upland habitats in the Russian River watershed. However, not an aquatic or riparian-dependent species. May occasionally visit terrestrial habitats in the project area. |

| Scientific Name Common Name | Legal Status² | Habitat | Nearest Documented Occurrence³ and Potential Presence in Project Area |
|--|---------------------------------|--|---|
| <i>Zalophus californianus</i> California sea lion | MMA | Occurs along the Pacific Coast mostly in California within 10 miles of shore. Feeds on fish and squid. Haulouts are beaches and rocks adjacent to water. | High. Individual California sea lions are infrequently observed swimming at the Russian River mouth and rarely using haulouts in the Estuary. |

¹Species List: Species listed in this table were developed from an official list prepared by the USFWS and CDFW for the Fish Flow Project.

²Legal Status:

FE: Listed as endangered under the FESA.

FT: Listed as threatened under the FESA.

FC: A candidate for listing under the FESA.

FSC: USFWS Species of Concern.

SE: Listed as endangered under the California Endangered Species Act (CESA).

ST: Listed as threatened under the CESA.

SC: Candidate for listing under the CESA.

SA: CDFW Special Animal.

CSC: A CDFW Species of Special Concern.

FP: Fully protected under California Fish and Game Code (Birds §3511; Mammals §4700; Reptiles and Amphibians §5050; Fish §5515).

PN: Protected native amphibian or reptile under California Fish and Game Code Chapter 5, §41 and §42, respectively.

MMA: protected by the federal Marine Mammal Act

³Source of Nearest Documented Occurrence: (CDFW, 2016a); Bill Cox, pers. comm. (California freshwater shrimp), David Cook, pers. comm. (western pond turtle, California red-legged frog, foothill yellow-legged frog); (USGS, 2016). Sonoma County Water Agency Russian River Estuary Management Project Pinniped Monitoring Plan, monitoring database.

Invertebrates

Giuliani's Dubiraphian Riffle Beetle

Giuliani's dubiraphian riffle beetle (*Dubiraphia giulianii*) is on the State's Special Animals list, which is watch list for potentially declining animals (CDFW, 2016b). There is very little known about the life history and distribution of this insect, but it is thought to only occur in California (USFWS, 2016a). But this beetle may be extirpated from the Russian River (NatureService, 2016). In general, riffle beetles are found in freshwater streams worldwide. About 100 species occur in North America. They are small aquatic beetles most often found crawling on stones, vegetation, and other solid debris in fast-moving streams. Both larvae and adults are fully-aquatic. There is one report of Giuliani's dubiraphian riffle beetle from the Russian River near Rio Nido from 1948, based on a California Academy of Science museum specimen. There are no recent reports. The status of this beetle in the project area is largely unknown.

Amphibians

California Red-legged Frog

The California red-legged frog (*Rana draytonii*) is federally listed as threatened and is a California species of special concern (CDFW, 2016b). The USFWS released a recovery plan in 2002 (USFWS, 2002), and critical habitat for the California red-legged frog was designated in 2010 after several legal and regulatory actions (USFWS, 2010). There is no critical habitat for the California red-legged frog within the Russian River watershed.

The California red-legged frog ranges from coastal mountains from southern Mendocino County southward to northern Baja California, and inland to the Sierra Nevada foothills (Jennings & Hayes, 1994) (Shaffer, Fellers, Voss, Olivers, & Pauly, 2004). The frog has been apparently extirpated from approximately 70% of its historic range (USFWS, 2002). California red-legged frogs are usually confined to aquatic habitats such as creeks, streams, and ponds, and occur primarily in areas that have pools about 2-3 feet deep, with adjacent dense emergent or riparian vegetation (Jennings & Hayes, 1988) (Cook & Jennings, 2007). Adult frogs move seasonally between their egg-laying sites and foraging habitat, but they rarely move long distances from their aquatic habitat. At one site in Santa Cruz County, 78 to 89 percent of adult frogs remained resident at their breeding location year-round, moving less than 425 feet from water (Bulger, Scott, & Seymour, 2003). Long-distance movement of more than two miles between aquatic sites has been reported (Bulger, Scott, & Seymour, 2003), but is likely a relatively rare event. California red-legged frogs breed from November to March. Egg masses are attached to emergent vegetation (Jennings & Hayes, 1994) and hatch within about two weeks. Metamorphosis generally occurs between July and September. This frog prefers freshwater and avoids brackish water greater than 4-9 parts per thousand (Jennings & Hayes, 1990).

California red-legged frog is known from several locations within the vicinity of the Russian River project area, including two tributaries of the Russian River. One adult and two juvenile California red-legged frogs were observed in Willow Creek in 1999, less than 0.5 miles upstream of the Estuary. One adult California red-legged frog was observed within Sheephouse Creek, less than 0.25 miles north of the Estuary, as recently as 2007, and another adult was observed within the

same creek in 1996, just over one mile upstream of the Estuary (CDFW, 2016a). This frog may occur in the Willow Creek area with freshwater, but unlikely to occur in tidal areas with brackish water. Aquatic habitats along Russian River, Dry Creek and Lake Mendocino and Lake Sonoma are not characteristic for this species and are likely unsuitable habitat due to an abundance predatory fish, crayfish, and bullfrogs.

California Giant Salamander

The California giant salamander (*Dicamptodon ensatus*) has a heavy, stocky body and is the largest salamander in California (Storer, 1925). This species is a recent addition to the State's Species of Special Concern, largely due to its restricted range to the coastal region of the greater San Francisco Bay Area. It occurs in wet coastal forests in or near clear, cold permanent and semi-permanent streams and seepages. Streams are typically moderate to high gradient with a rocky substrate, which is used for cover by larvae. Adults spend most of the time in the surrounding forest beneath cover, such as downed trees, rocks, and rodent burrows. Breeding occurs mostly in spring, usually in May, but later in the year at high elevations. Larvae may spend one or more years in their aquatic life stage before transforming into terrestrial salamanders. Some adults may retain their gills and continue to live in water. Both the larvae and adults are ambush predators eating a variety of invertebrate and vertebrate prey.

The California giant salamander is known from many tributary streams to the Russian River, especially in the more coastal, lower Russian River watershed. There are no reports of this salamander from the Russian River. Most of the low gradient valley reaches of the Russian River are unsuitable habitat. In higher gradient areas of the Russian River, such as between Hopland the Cloverdale, aquatic habitat seems suitable but the surrounding uplands are primarily hot and dry grasslands that may be unsuitable for adults. There are no reports from the Dry Creek project area but potential habitat is present. Also, there are reports from creeks within and upstream of Lake Sonoma prior to flooding in the early 1980s (CDFW, 2016a). However, due to the fluctuating water levels and silty substrate giant salamanders are unlikely to occur in Lake Mendocino or Lake Sonoma.

Foothill Yellow-legged Frog

The foothill yellow-legged frog (*Rana boylei*) is a Species of Special Concern (CDFW, 2016a). On July 1, 2015, the USFWS initiated a 12-month status review for listing of the foothill yellow-legged (USFWS, 2015c). This species inhabits foothill and mountain streams from sea level to about 6,000 feet from the Oregon border southward to the Transverse Mountains in Los Angeles County, in most of northern California west of the Cascade crest, and along the western flank of the Sierra Nevada southward to Kern County. Most records are for occurrences below 3,500 feet. The foothill yellow-legged frog is usually found near streams in a variety of woodland and forest habitats (Zeiner, Laudenslayer, Mayer, & White, 1988). They are usually found near water, although they can move away from creeks (Cook, White, White, & White, 2011). Breeding occurs as spring runoff declines usually any time from mid-March to May depending on local water conditions. The breeding season at any locality is usually about two weeks for most populations. Breeding frogs favor low to moderately steep-gradient streams. Females deposit eggs in shallow edge-water areas with slow water velocities. Egg masses are often attached to the downstream sides of cobbles and boulders, or other anchorage materials.

Eggs hatch in a few weeks. Tadpoles are herbivores and feed on diatoms or algae on the surface of rocks (Stebbins, 2003). Tadpoles transform in three to four months. Juvenile and adult frogs bask on boulders or in terrestrial sites along riffles, cascades, main channel pools, and plunge-pools, usually in sunlight. They are relatively strong swimmers and prefer faster water habitats than tadpoles.

There are five records of foothill yellow-legged frogs from the Russian River mainstem (CDFW, 2016a). Records of juvenile or adult frogs are from the confluence with Austin Creek near the upstream end of the Estuary, Geyserville in Alexander Valley, and upper Ukiah Valley. Egg masses or tadpoles in the Russian River were reported from Asti in Alexander Valley and upper Ukiah Valley. There are at least 28 reports in tributaries to the Russian River from Ukiah to Duncans Mills (CDFW, 2016a). Tributary creeks may provide most of the breeding, rearing, and foraging habitat for foothill yellow-legged frog in the Russian River watershed. However, based on the observation of all life stages the entire Russian River, except the Estuary, is potential habitat for the foothill yellow-legged frog. There are no reports of this frog from Dry Creek probably due to the dense canopy cover along most of the creek and marginal breeding habitat (David Cook, personal observation). The foothill yellow-legged frog is a stream species; therefore, there is no suitable habitat at Lake Mendocino and Sonoma.

Western Pond Turtle

Western pond turtle (*Actinemys marmorata*) is a Species of Special Concern in California. On April 10, 2015, the USFWS initiated a 12-month status review for listing of the western pond turtle (USFWS, 2015a). This turtle is uncommon to common in suitable aquatic habitats throughout California, west of the Sierra-Cascade crest and absent from desert regions, except in the Mojave Desert along the Mojave River and its tributaries (Zeiner, Laudenslayer, Mayer, & White, 1988). Western pond turtles are associated with a variety of aquatic habitats, both permanent and intermittent, including rivers, creeks, small lakes and ponds, marshes, irrigation ditches, and reservoirs. They may also occur in brackish to saltwater (Stebbins, 2003).

Water Agency biologists studied habitat use of western pond turtles in the Russian River below Healdsburg (Cook & Martini-Lamb, 2004). They found that basking sites had specific habitat features and were important in the distribution of turtles in the river. The cold-blooded turtles haul out of the water to increase internal body temperatures (thermoregulate) to increase activity and metabolism. Basking features were largely exposed logs located in pools with slow-moving water, depths of 5.2 feet (range 2.0 to 7.9 feet), and submerged cover consisting of logs, roots, and aquatic vegetation.

Although pond turtles spend much of their lives in water, they require terrestrial habitats for nesting. They also may overwinter on land and may spend part of the warmest months in aestivation on land. Use of terrestrial habitats for overwintering and aestivation may vary considerably with latitude and habitat type, as some turtles do not leave aquatic habitat (Stebbins, 2003). In general, nesting occurs between late April and early August (Jennings & Hayes, 1994) and nesting in the project area likely occurs in May and June (David Cook, personal observation). Females typically leave the water in late afternoon or early evening and travel to an upland location that may be a considerable distance from aquatic habitat. Eggs are

deposited in a nest, which is a small hole in the ground excavated by the female. The eggs hatch and young may overwinter in the nest, emerging from the nest site and moving to the aquatic habitat in the spring. Hatchlings spend much of their time feeding in shallow water that typically has a relatively dense cover of aquatic vegetation. Threats to western pond turtle include impacts to nesting habitat from agricultural and grazing activities, human development of habitat, and increased predation pressure from native and non-native predators as a result of human-induced landscape changes (Jennings & Hayes, 1994).

The western pond turtle is known from many locations within the Project Area. It is common along the Russian River from the brackish Estuary to Ukiah Valley, and is occasionally observed along Dry Creek (CDFW, 2016a); David Cook, personal observation). There are no reports of western pond turtles from Lake Mendocino and Lake Sonoma; however, these reservoirs provide suitable habitat and they are likely present.

Birds

Cooper's Hawk

Cooper's hawk (*Accipiter cooperii*) is on CDFW's Special Animals List, which is a watch list and has no official protection (CDFW, 2016b). This bird of prey is a breeding resident throughout most of the wooded portions of California (Zeiner, Laudenslayer, Mayer, & White, 1988). Preferred habitat is dense stands of live oak, riparian, or other forest habitat near water. Nests are constructed in trees usually in dense stands of deciduous trees. Hunting for small birds and mammals occur in broken woodlands and habitat edges. The CNDDDB had no reports of Cooper's hawks in the vicinity of the project area (CDFW, 2016a). However, they are known to breed in the Russian River watershed (USGS, 2016). Riparian habitats in the project area along the Russian River and Dry Creek provide suitable foraging and nesting habitat and this bird is likely present in the project area.

Golden Eagle

The golden eagle (*Aquila chrysaetos*) is a Fully Protected species in California for nesting and wintering birds (CDFW, 2016b). This raptor is an uncommon permanent resident and migrant throughout California, except the center of the Central Valley. Habitat typically includes rolling hills, mountain areas, sage-juniper flats, and deserts. Nests are constructed on cliffs and in large trees in open areas. The territories of these raptors in California range from 36 to 48 square miles. The golden eagle is likely a visitor to the project area and may hunt in open dry habitats in the vicinity. This eagle is not a riparian-dependent species but may nest in large trees in the project area. There is a moderate potential for the golden eagle to occur in the project area.

Tricolored Blackbird

The tricolored blackbird (*Agelaius tricolor*) is a California Species of Special Concern that is largely endemic to California. On September 18, 2015, the USFWS determined that a petition to protect the tricolored blackbird may be warranted and has initiated a status review of the species (USFWS, 2015b). Tricolored blackbird is found mostly throughout the Central Valley and San Francisco Bay-Delta regions (Riparian Habitat Joint Venture, 2004) and is highly

gregarious, foraging and nesting in flocks. Tricolored blackbirds forage in annual grasslands; wet and dry vernal pools and other seasonal wetlands; and croplands. They also forage occasionally in riparian scrub habitats and along marsh borders. Tricolored blackbirds nest near freshwater marshes. The three basic requirements for nesting sites include open accessible water; a protected nesting substrate, including both flooded or thorny or spiny vegetation; and a suitable foraging space providing adequate insect prey within a few miles of the nesting site (Beedy & Hamilton, 1999). The breeding season generally extends from mid-March into mid-July (Riparian Habitat Joint Venture, 2004). Nests built of mud and plant material are usually located a few feet over, or near, freshwater, but may be hidden on the ground among low vegetation. Primary threats to tricolored blackbirds are the direct loss and alteration of habitat, but other human activities and predation also threaten tricolored blackbirds.

Although the tricolored blackbird is known to occur in the Russian River watershed, there are no occurrence records in the project area (USGS, 2016) (CDFW, 2016a). There is one CNDDDB occurrence record from the project vicinity located southeast of Hopland at a reservoir in 1990. This site is approximately one mile from the Russian River. Marsh vegetation that blackbirds typically nest in is very limited in the project area. Lakes Sonoma and Mendocino are reservoirs with regulated water levels that preclude the establishment of most marsh vegetation. Also, the Russian River and Dry Creek have very limited marsh vegetation due to winter scouring flows that prevent the establishment of marsh plants in most areas. However, potentially suitable foraging habitat for this species may be present in the project area. This species has a moderate potential to occur within the project area mainly as a seasonal non-breeding resident or as a transient.

Great Egret

The great egret (*Ardea alba*) is on the CDFW's Special Animals List, which is a watch list and has no official protection (CDFW, 2016b). Nesting sites are of particular concern. This common shorebird occurs throughout California, except mountain and desert regions. Egrets feed along shorelines of lakes, estuaries, streams, and in pastures and farmlands. They nest in colonies in large trees usually near water. There are two reports of great egret colonial nest sites along the Russian River near Healdsburg and Duncans Mills (CDFW, 2016a). This bird likely forages within waterways in the project area and may nest in large riparian trees in the project area.

Great Blue Heron

The great blue heron (*Ardea herodias*) is on the CDFW's Special Animals List (CDFW, 2016b). Nesting sites are of particular concern. The great blue heron is fairly common all year throughout most of California and is found in a wide variety of habitats near sources of water, including sheltered, shallow bays and inlets, sloughs, marshes, wet meadows, and shores of lakes, and rivers (Zeiner, Laudenslayer, Mayer, & White, 1990a). The great blue heron usually nests in colonies containing a few to several hundred breeding pairs. Breeding generally occurs from March to May. Nests are usually placed in the tops of secluded large snags or live trees, usually among the tallest available (Zeiner, Laudenslayer, Mayer, & White, 1990a). One great blue heron rookery has been recorded along the Russian River Estuary in mature Douglas fir trees approximately 1.4 miles southwest of Duncan's Mills (CDFW, 2016a). Another rookery has been recorded along the Russian River near Riverfront Park downstream of the confluence with

Dry Creek. The Russian River, Dry Creek, Lake Mendocino, and Lake Sonoma support foraging habitat for great blue heron, and other rookeries could occur in large trees adjacent to the river.

Northern Harrier

Northern harrier (*Circus cyaneus*) is a California Species of Special Concern (CDFW, 2016b). This species is a permanent resident of northeastern California, coastal California, and the Central Valley, preferring open habitats such as grasslands, meadows, desert sinks, and freshwater and saltwater emergent wetlands (Zeiner, Laudenslayer, Mayer, & White, 1990a). Northern harrier is a widespread winter resident where suitable habitat is available. The breeding season for northern harrier extends from April to September, and nesting typically takes place on the ground in shrubby vegetation at the edges of marshes or along rivers and lakes. This species may also nest in grasslands, grain fields, and sagebrush flats. Northern harrier forages in low flights over open ground, feeding primarily on voles and other small mammals. However, northern harrier will also prey on birds, frogs, reptiles, crustaceans, insects, and even (rarely) on fish (Zeiner, Laudenslayer, Mayer, & White, 1990a).

Northern harriers are known from the Estuary and vicinity at the Jenner and Bridgehaven (USGS, 2016) (David Cook personal observation). This raptor likely forages and may nest on the wetland fringes of the Estuary project area.

Yellow warbler

Yellow warbler (Dendroica petechial) is a California Species of Special Concern (CDFW, 2016b). This warbler is a summer resident in much of northern California and breeds in riparian woodlands from the coastal to desert lowlands (Zeiner, Laudenslayer, Mayer, & White, 1990a). Other breeding habitat includes chaparral, ponderosa pine, and mixed conifer forest. This bird is usually found in riparian areas with a heavy brush understory. Birds usually arrive in California in April and depart by October. There are several reports of yellow warbler in the project vicinity (USGS, 2016) and riparian habitats in the project area provide suitable foraging and nesting habitat.

White-tailed Kite

The white-tailed kite (*Elanus leucurus*) is a California Fully Protected species (CDFW, 2016b). White-tailed kite occupy nearly all areas of California up to the western Sierra Nevada foothills and southeast deserts, inhabiting low elevation, open grasslands, savannah-like habitats, but are rarely found away from agricultural areas (Zeiner, Laudenslayer, Mayer, & White, 1990a). They nest in trees, usually with a dense canopy, but nest trees can vary from single, isolated trees to trees within large woodlands. Habitat elements that influence nest site selection and nesting distribution include habitat structure (usually a dense canopy) and prey abundance and availability. The breeding season occurs from approximately January to October, with peak activity occurring from May through August (Zeiner, Laudenslayer, Mayer, & White, 1990a). Nests are constructed of loosely piled sticks and twigs that are lined with grass, straw, or rootlets, and are placed near the top of a dense oak, willow, or other tree. A kite nest was reported approximately 0.4 miles from the Russian River near Healdsburg in 1985 and another possible nest in the Guerneville area in 1998 (CDFW, 2016a). However, there are no reports of

nests within the project area. This raptor is likely a frequent forager in the project vicinity and may nest in riparian trees in the project area.

American Peregrine Falcon

American peregrine falcon (*Falco peregrinus anatum*) is a California Fully Protected species (CDFW, 2016b). This species was formerly federally and state listed as endangered but has been delisted. This medium-sized bird breeds from Alaska and Canada southward to Baja California. American peregrine falcons usually winter in their breeding range. The primary nesting habitat for peregrine falcon tends to be cliffs or series of cliffs that dominate the surrounding landscape. However, suitable nesting sites can also be found at man-made structures, including tall towers and the ledges of tall buildings. American peregrine falcons hunt their prey in the air, usually over open habitat types such as waterways, fields, and wetland areas, diving at speeds of up to 200 miles per hour to strike their targets. Jays, flickers, meadowlarks, pigeons, starlings, shorebirds, waterfowl, and other readily available species make up the falcon's diet. This species may travel 10 to 12 miles from their nests in search of prey. Breeding takes place in late March and April, with a usual clutch size of three to four eggs.

Peregrine falcons are known to nest in Sonoma County but the location of this information restricted due to the vulnerability of this falcon to human disturbance (CDFW, 2016a) (BurrIDGE, 1995). Peregrine falcons have been observed foraging over the Estuary (David Cook, personal observation). Also, peregrine falcons have been observed hunting over Lake Mendocino (Sean White, personnel communication). There is no suitable nesting habitat within the Project Area. The open water of the Estuary, Russian River, and Lake Mendocino and Lake Sonoma serve as suitable foraging habitat for this species.

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is state-listed as endangered and Fully Protected in California (CDFW, 2016b); however, it was delisted from the FESA list in 2007 with a post-delisting monitoring plan. This plan requires monitoring the status of the bald eagle over a 20-year period with sampling events held once every 5 years. Bald eagles may be found along large lakes and rivers, coastal lagoons, sea cliffs and islands throughout California. A small number of bald eagles nest in the State, primarily in the more northern regions. In the winter, large numbers of non-nesting eagles reside at such locations as Tule Lake and Lower Klamath National Wildlife Refuges in extreme northern California and at scattered locations throughout the rest of the state, where there are large, open expanses of water. Bald eagles prey mostly on fish and waterfowl. Recently, bald eagles have been expanding their range and have been observed foraging and nesting in the Lake Sonoma area. Also, bald eagles have been observed roosting and foraging for fish at the Russian River Estuary, Alexander Valley (David Cook, personal observation), and at Lake Mendocino (Sean White, personnel communication). The open water of the project area provides suitable foraging for the bald eagle.

Yellow-breasted Chat

Yellow-breasted chat (*Icteria virens*) is a California Species of Special Concern (CDFW, 2016b). This warbler is a summer resident and migrant in coastal California and foothills of the Sierras. Most of the population winters in Central America. Typical habitats include riparian thickets of willow and brushy tangles near water. (Zeiner, Laudenslayer, Mayer, & White, 1990a). Nests

are constructed in dense shrubs along streams. There are a few reports of yellow-breasted chat in the project vicinity (USGS, 2016) and riparian habitats in the project area provide suitable foraging and nesting habitat.

Double-crested Cormorant

The double-crested cormorant (*Phalacrocorax auritus*) is on the CDFW's Special Animals List (CDFW, 2016b). Nesting sites are of particular concern. This species is a year-round resident along the entire coast of California and on inland lakes, typically in fresh and estuarine waters. This species roosts overnight beside water on offshore rocks, islands, steep cliffs, dead tree branches, wharfs, jetties, or even transmission lines. Double-crested cormorant must visit perches periodically during the day to dry plumage, and the perching sites must be devoid of vegetation. This species sometimes rests, or even sleeps, on water in daytime. Cormorants feed mainly on fish, but also on crustaceans and amphibians. They dive from the waters' surface to pursue prey underwater, typically in water that is less than 30 feet deep (Remsen, 1978). This cormorant nests near water, on islands or the mainland. Preferred nesting sites are wide rock ledges on the rugged slopes of cliffs and live or dead tall trees (Remsen, 1978). A known double-crested cormorant breeding colony from 1979 was recorded north of the mouth of the Russian River (CDFW, 2016a). Additionally, cormorants are commonly observed resting on along the shoreline and foraging in the Russian River Estuary (David Cook, personal observation). Cormorants forage along most of the lower Russian River within the project area, and likely forage in Lake Mendocino and Lake Sonoma.

Loggerhead Shrike

Loggerhead shrike (Lanius ludovicianus) is a California Species of Special Concern (CDFW, 2016b). This shrike is a resident of the lowlands and foothills of California. It prefers open woodland habitats with scattered trees, posts or other perches (Zeiner, Laudenslayer, Mayer, & White, 1990a). The loggerhead shrike has the interesting behavior of impaling its prey on sharp twigs or barbed wire to cache for later feeding. Nests are constructed in trees and shrubs with dense foliage. There are a few reports of shrikes in the project vicinity (USGS, 2016) and riparian habitats in the project area provide suitable foraging and nesting habitat.

Osprey

Osprey (*Pandion haliaetus*) is on the CDFW's Special Animals List. Nesting sites are of particular concern. This species is found primarily in ponderosa pine and mixed conifer habitats along seacoasts, lakes, and rivers. It preys mostly on fish at or below the water surface, but will also take small mammals, birds, reptiles, amphibians, and invertebrates. Foraging areas require large snags and open trees near large, clear, open waters. Ospreys typically swoop from flight and hover before diving to catch prey. This raptor breeds primarily in northern California and typically builds large stick nests in conifer trees, but may also use artificial platforms as nesting areas. The breeding season is from March to September. A nest may be as much as 250 feet above ground and is usually within 1,000 feet of fish-producing water. Typically, this raptor migrates in October southward along the coast and the western slope of the Sierra Nevada to Central and South America (Zeiner, Laudenslayer, Mayer, & White, 1990a).

Osprey likely occur throughout the project area. Osprey nests along the Russian River have been reported from Ukiah Valley, Healdsburg, Forestville, Guerneville, and Duncans Mills areas (CDFW, 2016a). Osprey are commonly observed foraging in the Estuary and Pacific Ocean and

returning with captured fish to nests inland along the Russian River (David Cook, personal observation). An osprey nest was reported north of Lake Mendocino in 2004 (CDFW, 2016a). Lake Mendocino and Lake Sonoma are likely used for foraging.

American White Pelican

The American white pelican (*Pelecanus erythrorhynchos*) is a California Species of Special Concern and state Fully Protected species. Nesting sites are of particular concern. This pelican occurs throughout North America along coastal and inland waterways. In California the white pelican occurs at large lakes, estuaries, San Francisco Bay, and Salton Sea. Nests are constructed on the ground on small islands. Nearest nesting is in Klamath basin near Oregon border. This bird forages for fish by diving in the water or scooping fish while swimming at the water surface. White pelicans are occasionally observed foraging or resting at the Russian River Estuary (David Cook, personal observation). The large open water areas of the Estuary and Lake Mendocino and Lake Sonoma provide suitable foraging habitat, but this pelican is not known to nest in the region.

California Brown Pelican

The California brown pelican (*Pelecanus occidentalis californicus*) is a large, shore-dwelling bird found in coastal and near shore marine habitats along the Pacific coast. Small, surface-schooling fishes make up the bulk of the diet of pelicans, which they capture by surface plunging. Following reproductive failure and severe population declines from the 1940s to 1970s, as a result of severe exposure to DDT and other contaminants, the brown pelican was federally-listed as endangered in 1970. Then the California subspecies was state-listed as endangered in 1971. In 2009, the USFWS and CDFW delisted the California brown pelican as endangered. This pelican remains on the State's Special Animals List (CDFW, 2016b).

The California brown pelican nests along the Pacific coast from southern California south to central Mexico, and on the California Channel Islands and the Salton Sea (Zeiner, Laudenslayer, Mayer, & White, 1990a). The breeding season extends from December to early August, peaking usually between February and May. Much of the post-breeding dispersal occurs northward (as far north as southern British Columbia), and by June many post-breeding pelicans are present in central California. Local abundance in central California usually peaks from August to October.

The California brown pelican is known to forage and roost along the Sonoma County coastline. However, it does not breed in northern California. California brown pelicans are commonly observed on Goat Rock State Beach and Russian River Estuary (David Cook personal observation). The Estuary project area provides suitable foraging habitat for the California brown pelican and logs and exposed sand/gravel bars, provide loafing and roosting habitat.

Mammals

Marine Mammals

Harbor seals, and occasionally California sea lions and northern elephant seals, collectively referred to as pinnipeds, are known to occur at the Estuary. Pinnipeds, whales, and dolphins are protected by the Marine Mammal Protection Act of 1972. Pinnipeds spend much of their life

hunting for fish and other sea animals in the ocean, bays, and estuaries. They haulout on beaches and exposed structures next to water. A haulout is defined as an area where pinnipeds temporarily leave the water for land in between foraging periods to rest, give birth, and nurse pups. Most pinniped activity in the project area is in the lower Estuary but they do swim upstream into freshwater. In the Estuary pinnipeds haulout at the river mouth (Jenner haulout), located on Goat Rock State Beach, and several logs and rock outcroppings in the lower Estuary (Martini-Lamb & Pecharich, 2016).

The earliest records of harbor seals at the Jenner haulout are from 1972 and their numbers at the site have steadily increased (Martini-Lamb, Luna, & Mortenson, 2009). Historically, pinniped monitoring at the Jenner haulout was conducted by Stewards of the Coast and Redwoods (Stewards) volunteers, California State Parks volunteer docents, local individuals, and Water Agency staff. The Stewards volunteers assist the public in safeguarding the harbor seal haulout. Dr. Joe Mortenson began monthly seal counts at the Jenner haulout in 1987, with nearby haulouts added to the counts thereafter. In 1989 Elinor Twohy, local resident, began daily counts and photographs of seals at the Jenner haulout. The Water Agency began periodic monitoring of pinnipeds in 1996 and then in 2009 implemented a pinniped monitoring that conducts regular surveys at the Jenner haulout plan (Martini-Lamb, Luna, & Mortenson, 2009).

Harbor Seal

The harbor seal (*Phoca vitulina*) a common and resident marine mammal along the Pacific coast. These seals prefer to stay close to shore in subtidal and intertidal habitats such as bays and estuaries, and sometimes venture into rivers. Groupings of various sizes can haulout on rocks, mudflats, and sandy/cobble coves (Zeiner, Laudenslayer, Mayer, & White, California's Wildlife. Vol. III: Mammals., 1990b). In general, the same sites are used over many years. Harbor seals feed opportunistically in shallow water on fish, crustaceans, and a few cephalopods. Harbor seals haulout on land for a variety of reasons, including rest, thermoregulation, and giving birth. They mate at sea and, in California, give birth from March to June, although the timing varies geographically and among local populations.

Harbor seals are by far the most abundant pinniped in the Russian River Estuary. Harbor seals commonly haulout on the sandbar at Russian River mouth year-round. Also, exposed logs in the Estuary are used as haulouts by a few seals. The haulout at the Russian River mouth is the largest seal haulout in Sonoma County and over 400 seals have been observed during peak use (Martini-Lamb, Luna, & Mortenson, 2009) (Martini-Lamb & Pecharich, 2016). Seals forage for fish in the ocean as well as the Estuary and freshwater upstream. Female seals give birth to pups and nurse on the beach during spring (NMFS, 2011).

California Sea Lion

The California sea lion (*Zalophus californianus*) is a common marine mammal found along the Pacific coast from southern Mexico to British Columbia, Canada. They breed in Southern California and the Channel Islands after which they migrate along the Pacific coast towards the San Francisco Bay. No established rookeries are known north of Point Reyes (NMFS, 2011). Breeding typically occurs between May and August. California sea lions haulout on offshore rocks, sloping rock outcroppings, sandy and cobblestone beaches, jetties, and buoys (Zeiner,

Vegetation and Wildlife

Laudenslayer, Mayer, & White, 1990b). They are opportunistic and will feed on a variety of aquatic animals including squid, anchovy, rockfish and octopus. California sea lions are known to occur within the Russian River Estuary. Typically, solitary sea lions are occasionally observed at the mouth of the Russian River and Estuary (Martini-Lamb & Pecharich, 2016). A few juvenile sea lions have been observed occasionally on rock outcrops in the lower Estuary, but no birthing occurs at the Russian River mouth and Estuary project area. (NMFS, 2011).

Northern Elephant Seal

The northern elephant seal (*Mirounga angustirostris*) range extends along the Pacific coast from Alaska south to Mexico. They typically breed in California on protected islands, such as the Channel Islands, or on the mainland. Northern elephant seals spend about 9 months of the year in the eastern and central North Pacific Ocean (Zeiner, Laudenslayer, Mayer, & White, 1990b). Adult seals return to land between March and August to molt and return in the winter for breeding. The breeding season begins mid-December and extends until March.

Individual northern elephant seals have been reported from the Sonoma Coast. Elephant seals were observed at the mouth of the Russian River during surveys conducted between 1987 and 1995, and have been observed in other years as well (Martini-Lamb, Luna, & Mortenson, 2009). The numbers of elephant seals observed during these surveys was usually low, with only one to two observed at a time. A single, juvenile male northern elephant seal utilized the Jenner haulout for a few years, and was observed harassing harbor seals. No breeding rookery for elephant seals occurs at the Russian River mouth and Estuary project area (NMFS, 2011).

Bats

Pallid Bat

The pallid bat (*Antrozous pallidus*), a California Species of Special Concern, occurs throughout California, except in parts of the high Sierra and the northwestern corner of the state (Zeiner, Laudenslayer, Mayer, & White, 1990b). The pallid bat inhabits a variety of habitats, such as grasslands, shrublands, woodlands, and forests; however, it is most abundant in open, dry habitats with rocky areas for roosting. Pallid bats roost alone, in small groups, or gregariously. Roosts include caves, crevices in rocky outcrops and cliffs, mines, trees, and various man-made structures (e.g., bridges, barns, porches), and generally have unobstructed entrances/exits and are high above the ground, warm, and inaccessible to terrestrial predators. Year-to-year and night-to-night roost reuse is common; however, bats may switch day roosts on a daily and seasonal basis. Mating occurs from late October to February, and maternity colonies of up to 100 individuals form in early April. One or two pups are usually born May or June, and are weaned in approximately 6 to 7 weeks. Maternity colonies disperse between August and October.

There are several occurrence records of pallid bats in the project vicinity, including: Hopland, Alexander Valley, Dry Creek Valley, and Guerneville/Occidental area (CDFW, 2016a). Most records are from buildings used for roosting. The project area provides potential foraging habitat for the pallid bat. Large riparian trees along the Russian River and Dry Creek project areas, especially in areas not typically disturbed by humans, provide potential roosting habitat. Also,

bridges over the Russian River, Dry Creek, and Lake Mendocino and Lake Sonoma may provide roosting habitat.

Townsend's Big-eared Bat

Townsend's big-eared bat (*Corynorhinus townsendii*) is a California Species of Special Concern that typically inhabits caves, buildings, and rock outcrops usually in association with desert scrub and/or pinon-juniper plant communities. While most common in mesic sites, this bat is found in a wide variety of habitats throughout California. Maternity roosts are found in caves, tunnels, mines, and buildings, and most young are born between May and June (Zeiner, Laudenslayer, Mayer, & White, 1990b). This species requires drinking water, and forages on small moths and soft-bodied insects. Maternity roosting sites are very sensitive to disturbance, and any nursery colonies caves have been abandoned.

The only known report of this bat in the project vicinity is from Hopland Field Station in Ukiah Valley from 1987 (CDFW, 2016a). There are no records within the project area. However, bridges over the Russian River, Dry Creek, and Lake Mendocino and Lake Sonoma may provide potential roosting habitat.

Western Red Bat

The western red bat (*Lasiurus blossevillei*) is a California Species of Special Concern. This bat species occurs in riparian habitats throughout most of California, except the northern Great Basin region. They roost individually in dense clumps of tree foliage in riparian areas, orchards, and suburban areas. Western red bats are primarily moth specialists, but will forage for a variety of other insects. Individuals have been observed foraging around street lamps and floodlights in suburban areas.

There are two reports of western red bat in the project vicinity (CDFW, 2016a). One western red bat was reported in Alexander Valley in 1954. A more recent report in 2003 was from a rock quarry near Guerneville where western red bats were detected within tree cavities in a mixed evergreen forest. Potential foraging habitat is present in the project area and riparian trees along the Russian River and Dry Creek provide potential roosting habitat.

Hoary bat

The hoary bat (*Lasiurus cinereus*) is a California Species of Special Concern. This bat species occurs throughout most of California, except desert regions. This bat prefers to forage in open habitats or along habitat edges (Zeiner, Laudenslayer, Mayer, & White, 1990b). It roosts in dense foliage in medium to large trees. There are two historic reports of hoary bats in the project vicinity (CDFW, 2016a). One record is from the Guerneville area in 1913 and the other record is from Forestville in 1948. There are no reports from within the project area. Potential foraging habitat is present in the project area and riparian trees along the Russian River and Dry Creek provide potential roosting habitat.

4.4.3 Regulatory Framework

Federal Regulations

Federal Endangered Species Act

The USFWS and the National Marine Fisheries Service (NMFS) enforce the provisions of the Federal Endangered Species Act of 1973 (hereafter, “FESA,” 16 USC Section 1531 et seq.). USFWS administers FESA for all terrestrial species. NMFS administers FESA for marine fish species, including anadromous salmonids. Threatened and Endangered Species on the Federal list (50 CFR Section 17.11, 17.12) are protected from take, defined as direct or indirect harm, unless a Section 10(a) Incidental Take Permit is granted or a Biological Opinion with incidental take provisions is issued.

Pursuant to the requirements of FESA, a federal agency reviewing a proposed project within its jurisdiction must determine whether any federally listed species may be present in the study area and determine whether the proposed project will have a potentially significant impact upon such species. Under FESA, habitat loss may be considered to be an impact to the species. In addition, the federal agency is required to determine whether the project is likely to jeopardize the continued existence of any species that is proposed for listing under FESA or to result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC 1536[3], [4]). Under Section 15065(a)(2) of the CEQA Guidelines, a project is deemed to have a significant effect on the environment if it would “substantially reduce the number or restrict the range of an endangered, rare, or threatened species. As a result, impacts to listed species or their habitats will usually be considered significant and would require mitigation.

Under the FESA, there are two ways to obtain incidental take authority. If a project has no federal “nexus” (i.e., requires no federal funding, approval, or permit), a project proponent must obtain an “Incidental Take Permit” under Section 10(a). If a federal “nexus” exists, the federal agency granting the funding, approval, or permit for the project must consult with NMFS or USFWS under Section 7. This “consultation” process can result in the issuance of a Biological Opinion giving incidental take authority to the project applicant.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 (MBTA) (16 USC Sections 703-712) makes it unlawful to pursue, capture, kill, possess or attempt to do the same to any migratory bird, part, nest or egg listed in wildlife protection treaties between the United States, Great Britain, Mexico, Japan and the countries of the former Soviet Union. These birds are identified on a list in 50 CFR Section 10.13. As with FESA, the MBTA authorizes the Secretary of the Interior to issue permits for incidental take. Nesting birds and the contents of nests within the project area are protected pursuant to the MBTA.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 USC 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from “taking” bald eagles, including their parts, nests, or eggs. The act provides criminal penalties for persons who “take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle [or any golden eagle], alive or dead, or any part, nest, or egg thereof.” The act defines “take” as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.”

Clean Water Act

The USACE has primary federal responsibility for administering regulations that concern wetlands and “waters of the U.S.”, under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Section 404 regulates the discharge of dredged and fill material into “waters of the U.S.” The USACE requires that a permit be obtained if a project proposes placing structures within, over, or under navigable waters and/or discharging dredged or fill material into “waters of the U.S.” below the ordinary high-water mark. The Environmental Protection Agency (EPA), USFWS, NMFS, and several other agencies provide comment on USACE permit applications. The USACE has established a series of nationwide permits (NWP) that authorize certain activities in “waters of the U.S.” provided the proposed activity could demonstrate compliance with standard conditions. Normally, the USACE requires Individual Permits (IP) for work activities that do not qualify for a NWP. Wetlands and other waters that lack hydrologic connection to navigable “waters of the U.S.”, and that lack a nexus to interstate and foreign commerce, are not regulated by the Clean Water Act and do not fall under the jurisdiction of the USACE. Such features are called “isolated.”

Water quality certification pursuant to Section 401 of the Clean Water Act applies to projects and project applicants that have applied for a federal permit to conduct any activity, including construction or operation of facilities, which may result in discharge into navigable waters. The State Water Resources Control Board (SWRCB), acting through the local Regional Water Quality Control Board (RWQCB), must certify that a USACE permit action meets state water quality objectives.

Federal Marine Mammal Protection Act

The Secretary of Commerce (represented by NMFS) and the Secretary of the Interior (represented by the USFWS) have joint responsibility in protecting marine mammals under the Marine Mammal Protection Act (50 CFR 216). The NMFS is responsible for cetaceans and pinnipeds (other than walrus), and USFWS is responsible for all other marine mammals, including sea otter, walrus, polar bear, dugong and manatee. The Marine Mammal Protection Act (MMPA) established a moratorium on the taking of marine mammals in United States waters. It defines “take” to mean “to hunt, harass, capture, or kill” any marine mammal or attempt to do so. Exceptions to the moratorium can be made through permitting actions for take incidental to commercial fishing and other non-fishing activities, for scientific research, and for public display at licensed institutions.

State Regulations

California Endangered Species Act

The California Endangered Species Act (CESA), authorized under California Fish and Game Code Section 2080, is similar to FESA, but is limited to State-listed threatened and endangered species. CESA prohibits the take of State-listed threatened and endangered species. Additionally, the CDFW maintains a list of Species of Special Concern, which serves as a “watch list.” Similar to the FESA, under the CESA, a project applicant may obtain an incidental take permit from CDFW if certain conditions are met. In addition, CDFW can authorize take through a “consistency determination” if the applicant has obtained incidental take authorization under the FESA and CDFW determines that the federal take authorization is consistent with the CESA. No incidental take permit can be issued if its issuance would “jeopardize the continued existence of the species,” and impacts of the authorized take must be minimized and fully mitigated.

Porter Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, the SWRCB has authority over protection of water quality. The Porter-Cologne Act established the RWQCBs and authorized them to regulate water quality at the regional level. The RWQCBs regulate pollutant discharges and require a report of waste discharge to be filed for any proposed discharge to surface water or groundwater. The RWQCB will either issue waste discharge requirements or a waiver of waste discharge requirements to authorize the activity.

CEQA Guidelines

Although threatened and endangered species are protected by specific federal and state statutes, CEQA Guidelines Section 15380(d) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet specified criteria. These criteria have been modeled after the definition in the FESA and the section of the California Fish and Game Code defining rare or endangered plants and animals. Section 15380(d) allows a public agency to undertake a review to determine if a significant effect on species that have not yet been listed by either the USFWS or CDFW (i.e., candidate species) would occur. Thus, CEQA provides an agency with the ability to protect a species from a project’s potential impacts until the respective government agencies have an opportunity to designate the species as protected.

California Fish and Game Code (Bird Protection)

California Fish and Game Code Sections 3503 and 3503.5 prohibit the take or needless destruction of bird nests or eggs; and prohibit the take, possession and destruction of birds-of-prey (birds of the orders Strigiformes and Falconiformes, which are owls, falcons and hawks). California Fish and Game Code Section 3511 lists birds that are “fully protected,” which may not be taken or possessed except under specific permit. Depending on the presence of special-status species or nesting raptors during periods of project construction, consultation with the CDFW may be necessary. California Fish and Game Code Section 3800 prohibits the take of

nongame birds. Nongame birds are defined as, “All birds occurring naturally in California that are not resident game birds, migratory game birds, or fully protected birds.”

California Fish and Game Code (Streambed Alteration)

Under the California Fish and Game Code Sections 1600-1607, CDFW is authorized to develop mitigation measures and enter into Streambed Alteration Agreements with applicants whose projects would obstruct the flow of, or alter the bed, channel, or bank of a river or stream in which there is a fish or wildlife resource, including intermittent and ephemeral streams. All diversions, obstructions, or changes to natural flow or bed, channel, or bank of any river, stream or lake in California are subject to the regulatory authority of CDFW pursuant to sections 1600 through 1607 of the California Fish and Game Code. Sections 1600-1607 require notification to the CDFW of any activity that could affect the bank or bed of any stream that has value to fish and wildlife. Upon notification, the CDFW has the responsibility to prepare a Streambed Alteration Agreement, in consultation with the project proponent.

Marine Life Protection Act

The Marine Life Protection Act (MLPA) was enacted in 1999 and is part of the California Fish and Game Code (Sections 2850-2863). The MLPA requires California to reevaluate all existing marine protected areas (MPAs) and potentially design new MPAs that together function as a statewide network. MPAs are developed on a regional basis and are evaluated over time to assess their effectiveness. There are three different types of MPAs including: state marine reserve, state marine park, state marine recreation area and state marine conservation area. Each designation provides authority for different levels of restriction on human uses and includes various objectives. The MLPA sets the following goals for the Program [California Fish and Game Code subsection 2853(b)]:

1. To protect the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems.
2. To help sustain, conserve, and protect marine life populations, including those of economic value, and rebuild those that are depleted.
3. To improve recreational, educational, and study opportunities provided by marine ecosystems that are subject to minimal human disturbance, and to manage these uses in a manner consistent with protecting biodiversity.
4. To protect marine natural heritage, including protection of representative and unique marine life habitats in California waters for their intrinsic value.
5. To ensure that California's MPAs have clearly defined objectives, effective management measures, and adequate enforcement, and are based on sound scientific guidelines.
6. To ensure that the state's MPAs are designed and managed, to the extent possible, as a network.

The Fish Flow project area is within two MPAs. Russian River State Marine Recreation Management Area includes the Russian River Estuary from Highway 1 Bridge downstream approximately 2 miles to the barrier beach at the river mouth. The Russian River State Marine

Vegetation and Wildlife

Conservation Area consists of coastal waters in the vicinity of the Russian River, including the ocean side of the river mouth. The regulations that follow are associated with these MPAs.

Russian River State Marine Recreation Management Area

Take of all living marine resources is prohibited except recreation hunting of waterfowl is allowed unless otherwise restricted by hunting regulations.

Russian River State Marine Conservation Area

Take of all living marine resources is prohibited except the following species may be taken recreationally: Dungeness crab by trap, and surf smelt using hand-held dip net or beach net. Also, Dungeness crab by trap may be taken commercially.

Local Regulations

Mendocino County General Plan

Parts of the Proposed Project are located within the jurisdiction of the Mendocino County General Plan (Mendocino County, 2009). The Mendocino County General Plan is discussed further in Section 4.4.5.

Sonoma County Articles and Ordinances

The Sonoma County Tree Protection and Replacement Ordinance (No. 4014) sets preservation and protection standards for protected trees with a 9-inch or greater diameter at breast height. Protected trees include big-leaf maple (*Acer macrophyllum*), black oak, blue oak (*Quercus douglasii*), coast live oak, interior live oak (*Quercus wislizenii*), madrone, oracle oak (*Quercus morehus*), Oregon oak (*Quercus garryana*), redwood, valley oak, California bay laurel, and their hybrids. Only mature valley oaks are considered a protected tree of special significance. Numerical values (arboreal value) are assigned to trees based on their trunk diameters. Compensation for removal of protected trees is calculated in either of two manners, determined by the applicant at the time of application. Option 1 involves analysis of trees only within the development area. This option requires 100 percent replacement of arboreal value or payment of in lieu fees. Option 2 involves analysis of trees in the entire site. This option allows for removal of 50 percent of the site's arboreal value, and requires replacement of that loss which is over 50 percent of the arboreal value.

Articles 65 (Riparian Corridor Combining Zone) and 66 (Biotic Habitat Combining Zone) of the Sonoma County zoning code (Ordinance No. 6098) protects riparian corridors and functions along designated streams. Development setbacks of 200 feet are designated along the Russian River and 100 feet along Dry Creek. Prohibited activities within setbacks include grading, vegetation removal, agricultural cultivation, structures, roads, utility lines, and parking lots. The Proposed Project would not involve any construction-related activities or any prohibited activity under these zoning codes.

Sonoma County Article 67 (Ordinance No. 4991) protects valley oak trees and valley oak woodlands within the Valley Oak Habitat (VOH) Combining District boundaries. This ordinance requires mitigation for removal of any large valley oak measuring sixty inches or greater at

diameter breast height within the Valley Oak Habitat district boundaries. Mitigation for tree removal may be in the form of (1) tree replacement by planting valley oak seedlings on the subject property or on another site in the county having the geographic, soil, and other conditions necessary to sustain a viable population of valley oaks; (2) retaining other valley oak trees on the subject property; (3) a combination of measures (1) and (2); or (4) paying an in-lieu fee, which shall be used exclusively for valley oak planting programs in the County.

Sonoma County Ordinance No. 3651 preserves heritage and landmark trees that have been nominated and accepted by the County as heritage or landmark trees. This ordinance requires the protection and preservation of heritage and landmark trees.

Sonoma County General Plan

Parts of the Proposed Project are located within the jurisdiction of Sonoma County General Plan 2020 (PRMD, 2012). The Sonoma County General Plan is discussed further in Section 4.4.5.

4.4.4 Impact Analysis

This section describes the impact analysis relating to vegetation and wildlife for the Proposed Project. It describes the methods used to determine the impacts of the project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion, where applicable.

Methodology

The impact analysis below compares the elements of the Proposed Project and alternatives with the baseline or existing conditions within the project area. As mentioned in Chapter 4.0, “Environmental Setting, Impacts and Mitigation,” Baseline Conditions consists of minimum instream flow requirements included in the Water Agency’s water right permits as established by the State Water Resources Control Board’s Decision 1610 and the Russian River Estuary Management Project with a target water elevation in the Estuary of 7 feet (range 4.5 to 9 feet) from May 15 to October 15. Flow throughout the Russian River and Dry Creek during the rainy season from November to April is largely influenced by rainfall and tributary inflows. Proposed Project instream flows are most relevant during the dry season (May to October) when releases from Lake Mendocino and Lake Sonoma contribute a large portion of the flows to the Russian River and Dry Creek.

The Proposed Project would not involve constructing, improving, or eliminating any facilities; therefore, there would be no temporary or permanent impacts on biological resources resulting from construction. The following assumptions were also made regarding project-related impacts on biological resources:

- Project implementation would entail no physical activities that would interfere with migratory wildlife corridors, the movement of resident or migratory wildlife species, or native wildlife nursery sites; and

Vegetation and Wildlife

- Project implementation would not have significant direct or indirect impacts on terrestrial plant communities and wildlife habitat (e.g., annual grassland, chaparral, oak woodland, stabilized coastal dune, and coastal bluff) because those communities are not affected by changes in reservoir water surface elevation or flow in the Russian River and Dry Creek.
- Vegetation along the shores of Lake Mendocino and Lake Sonoma, as well as birds and other wildlife that may use the lakes, are accustomed to fluctuations in water elevation that occur under Baseline Conditions.
- Estuaries are complex, dynamic ecosystems, normally experiencing changes between seasons, between years, and between different places in the same estuary. An evaluation of the effects of changes due to changes in Russian River flow entering the Estuary must bear in mind that, when anticipating future conditions, determination of significance is judged relative to the baseline required by CEQA (i.e. current conditions). Under the current Estuary management practices, water depth and salinity, as well as other water quality parameters, fluctuate at varying degrees and continuously across a wide range.
- Minimum instream flows in Dry Creek and the Russian River would decrease during the dry season as a result of the Proposed Project. These flow changes are anticipated to have gradual effects on wildlife that use the Russian River and Dry Creek environment for all or a portion of their life cycle. Stream flows during the wet season, when flows are largely from rainfall runoff and tributary flow, would be negligibly effected by dam releases under the project.

Impacts on biological resources are evaluated based on the likelihood that sensitive natural communities, special status plant and animal species, wildlife corridors and nursery sites, and other protected biological resources are present within the project area (as discussed in Section 4.4.2, Environmental Setting), and the likely effects that changes in lake levels and stream flows may have on these resources. Sensitive biological resources that are considered unlikely or have a low potential to occur within the project area are not considered in the impact analysis (see Section 4.4.2).

The analysis of the effects of the project alternatives on plant and wildlife resources emphasizes impacts on riparian, wetland, and aquatic habitats, which were assessed by determining changes in Lake Mendocino and Lake Sonoma water surface elevations and changes in Russian River and Dry Creek flows. Modeling using historic hydrology data was used to simulate surface elevations in the two reservoirs and flows downstream of the reservoirs and the corresponding changes under project conditions. Projected changes in reservoir surface elevations and stream flow were then compared against Baseline Conditions to determine potential impacts, including changes in habitat accessible to special-status species. Please see Chapter 3, Project Description, and Chapter 4.1, Hydrology, for modeling results and Baseline Conditions.

Significance Criteria

The criteria used to determine the significance of an impact are based on the environmental checklist in Appendix G of the CEQA Guidelines. For this analysis, implementation of the

proposed Fish Flow Project would be considered to have a significant impact associated with biological resources if it would:

1. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the CDFW, USFWS, or NMFS;
2. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFW or USFWS;
3. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means;
4. Interfere substantially with the movement of any native resident or migratory fish¹ or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
5. Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce the number or restrict the range of an endangered, rare, or threatened species;
6. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
7. Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved plan.

Based on the nature and function of the Proposed Project, the following criteria included in Appendix G of the CEQA Guidelines do not apply to this analysis and are not discussed further, as explained below.

- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved plan.

There are no adopted habitat conservation plans, natural community conservation plans, or other approved plan for the project area and, therefore, impacts related to conflict with such a plan are not applicable and are not further discussed. The Proposed Project would not conflict with local tree preservation policies or ordinances and is not discussed further. Please see Section 4.4.5 for general plan consistency and local policies or ordinances protecting riparian corridors. Plans related to fisheries are discussed in Chapter 4.3, Fisheries Resources.

Impacts and Mitigation Measures

The following section presents a detailed discussion of potential biological impacts associated with the project alternatives, including the No Project 1 and No Project 2 alternatives, and the Proposed Project. In regards to vegetative communities and wildlife the project alternatives

¹ Fish are discussed in Section 4.3.

have similar effects and have been grouped in the below impact analysis. If impacts of alternatives are significantly different they are addressed separately. Also, each impact topic has been grouped by project area location. Each impact discussion includes an analysis of the impact, a summary statement of the impact and its significance, and proposed mitigation measures, where applicable. Please refer to Chapter 4.3, "Fisheries Resources," for information on potential impacts to fish resources in the project area.

Sensitive Natural Communities

Impact 4.4.1: Changes in water surface elevations and flows could adversely affect sensitive natural communities. (Less than Significant)

Implementation of a project alternative could change the extent, composition, and distribution of the vegetation communities within the project area. These communities include wetland and riparian plant communities in Table 4.4.1. Coastal and valley freshwater marsh is the only CDFW sensitive natural community in the project area that could be adversely affected by changes in surface water elevation. Riparian habitats occurring along the stream banks in the project area are generally considered sensitive communities. The adverse and beneficial effects of the project alternative differs by project area, which are described below.

Lake Mendocino and Lake Sonoma

Vegetation along the shores of Lake Mendocino and Lake Sonoma has been determined by seasonal fluctuations in reservoir elevation that occur under Baseline Conditions. The plant communities along the shoreline have been exposed to historically large changes in water-surface elevation that occur as part of reservoir operations. Changes in water releases from Coyote Valley Dam and Warm Springs Dam would affect water levels in Lake Mendocino and Lake Sonoma. Generally, the decrease in dam releases during the dry season would reduce lake level fluctuations by reducing late-summer drawdown under the Proposed Project and No Project 2 Alternative, and create more stable aquatic conditions. The maximum water surface level in each reservoir would be the same for the No Project 1 and No Project 2 alternatives, as well as the Proposed Project, and under Baseline Conditions. This maximum water level determines the edge of the upper shoreline and upland vegetation. Annual plant species may seasonally colonize exposed shoreline areas.

At Lake Mendocino baseline water surface elevations range from 665 to 767 feet mean sea level (MSL) for a change of 102 feet. Both the No Project 1 and No Project 2 alternatives would have the same stage change at 102 feet. The Proposed Project would have less fluctuation in stage change at 82 feet. At Lake Sonoma the range of baseline water surface elevations are 357 to 488 feet MSL for a stage change of 132 feet. The modeled stage changes would range from 147 feet for No Project 1 Alternative, 139 feet for No Project 2 Alternative, and 140 feet for the Proposed Project. At both Lake Mendocino and Lake Sonoma, changes in water surface elevations would be similar to fluctuations currently experienced under Baseline Conditions. As such, no potential impacts to biological resources, especially shoreline habitats and species that use these habitats, are anticipated.

Russian River and Dry Creek

The project alternatives could have an adverse impact on sensitive natural communities caused by changes in minimum instream flows in the Russian River and Dry Creek compared to Baseline Conditions. Coastal and valley freshwater marsh and riparian communities are dependent on a perennial water source. Hydrophytic (wetland) plant species are often distributed along the shoreline and banks based on preferred inundation, substrate type, soil saturation, and exposure to scour. Changes in minimum instream flows during the plant growing season could shift the distribution of hydrophytic species slightly down onto the lower stream banks and active stream channel depending on the change in water surface elevation and wetted width. Three habitat types are discussed in detail below.

Riparian

The riparian community, dominated by trees and shrubs, that occurs along the banks of the Russian River and Dry Creek in the project area are deep rooted, receive water from shallow groundwater, and are expected to be unaffected by slight changes in stage height or wetted width. Most riparian trees can be classified as “phreatopytes,” or Latin for “well plant,” indicating that these taxa root into groundwater sources (Barbour, Keeler-Wolf, & Schoenherr, 2007) (Holland R. F., 1990) (Warner, 1984). The term is commonly used in the arid west to describe species and habitats that are dependent on a sustained source of water either from seeps, springs, groundwater and/or surface water, but most commonly for plants rooted into the “underflow” zone or area of shallow groundwater associated with streams and river channels and any historic meanders. Phreatophytes dominate the riparian zone along the Russian River and Dry Creek and include Fremont’s cottonwood, red willow, sandbar willow (*Salix exigua*), red and white alder, box elder (*Acer negundo californicum*) and Oregon ash.

Changes in stage height and wetted width at different flows in the Russian River and Dry Creek are described in Section 4.1, Hydrology. Based on these analyses, the stage height (water surface elevation) in the Russian River and Dry Creek during the spring and summer growing season under the Proposed Project and No Project 1 and No Project 2 alternatives would generally have a minimal decrease compared to Baseline Conditions. Maximum observed stage change between the Proposed Project and Baseline Conditions ranged from 2 inches in Dry Creek, 3 inches in the Upper Russian River to a maximum of 7 inches in the Lower Russian River. Wetted width resulting from a reduction in stage height can vary widely across riffles, but has little effect in runs or pools, and has a negligible effect on the underflow.

Changes in minimum instream flows and stage in the Russian River and Dry Creek during summer conditions are not anticipated to change groundwater elevation of the alluvial aquifer in the project area as a result of the Proposed Project or the No Project 1 and No Project 2 alternatives. The alluvial aquifer that supports the existing riparian vegetation along the Russian River and Dry Creek is in dynamic equilibrium with surface flows (Malanson, 1993). In general, winter precipitation and surface runoff contributes to recharge of the alluvial aquifer. In addition, minimum instream flows maintain a continuous source of recharge to the alluvial aquifer that lies beneath and adjacent to the Russian River. Although the Proposed Project and No Project 2 Alternative would reduce the volume of water flowing in the Russian River and Dry Creek during the dry season, surface waters would be maintained throughout. Woody and deep-rooted

riparian plants would be unaffected by changes in summer time minimum instream flow, as the changes would not affect the shallow riparian aquifer that supports this community. Changes in water surface elevations and flows would not adversely affect the riparian community and there would be no impact.

Freshwater Marsh and Aquatic Habitats (Open Water)

Freshwater marsh communities that typically occur along the shoreline of waterways may have gradual and slight shifts toward wetter shoreline areas compared to Baseline Conditions. This could represent a shift of reducing overall open water habitat by affecting fringe habitats in the Russian River. However, this shift is expected to be minimal because marsh vegetation is very restricted in the existing active channel due to the scouring and sedimentary effects of winter floods and the incised stream banks of the Russian River and Dry Creek that determine shoreline conditions favorable to marsh vegetation establishment.

Marsh plants are highly dependent on a perennial source of water. These wetland plants in the Russian River and Dry Creek include perennial and annual species. The adaptation of vegetative communities along the shoreline fringe of the river is difficult to predict, as it is subject to several factors. Slight changes in stage height could shift the wetted area down vertically approximately 2-3 inches. This change is not anticipated to affect much deeper rooting trees and shrubs rooted into the shallow groundwater (Figure 4.4.2). This small shift in shoreline wetted area could affect the duration of inundation of a narrow band of established grasses and herbs or prevent marsh species from colonizing in that narrow zone. However, flows in the Russian River and Dry Creek under the Proposed Project represent a range of variation already experienced between freshwater marsh, riparian, and the active channel brought on naturally by shifts in morphology (sediment deposition and scour) during large storms as well as the variation already experienced under Baseline Conditions.

It is anticipated that conditions resulting from the Proposed Project and No Project 1 and No Project 2 alternatives would be consistent with the range of Baseline Conditions along the Russian River and Dry Creek. Although the adaptation of vegetative communities cannot be precisely predicted, vegetative assemblages are expected to shift slightly towards wetter conditions. For example, the distribution of wetland vegetation may move down in elevation to match changes in water surface elevation. As a result the Proposed Project and No Project 1 and No Project 2 alternatives would have a less-than-significant impact to freshwater marsh and aquatic habitats and no mitigation is required.

Active Stream Channel

The active channel along the Russian River varies in width from approximately 200 feet in the Ukiah Valley to over 1,200 feet in Alexander Valley. The deeply incised Dry Creek has an active channel width of approximately 40 to 80 feet. The largely ephemeral habitat supported by the active channel is not anticipated to display any significant shifts as a result of the No Project 1 Alternative, No Project 2 Alternative, or the Proposed Project. Maximum changes in wetted width (3 to 80 feet) would occur over shallow riffles, while minor width changes are anticipated along runs and pools (6 to 12 inches). Vegetative communities within the active channel are naturally sparse due to frequent disturbance from flows.

Potential changes in vegetative communities along the active channel of the Russian River and Dry Creek project area is difficult to predict, as they would be subject to several factors, such as annual rainfall, scour from flooding, and upstream land use practices. It is anticipated that conditions resulting from the No Project 1 alternative, No Project 2 alternative, and Proposed Project would be similar to the range of Baseline Conditions in the project area. The above analysis demonstrates that changes in hydrophytic vegetative assemblages would likely be towards no change in riparian communities and slight shifts along the shoreline of sensitive coastal and valley freshwater marsh immediately adjacent to fluvial-ruderal habitats. Therefore, the Proposed Project and No Project 1 and No Project 2 alternatives would potentially result in a less-than-significant impact to sensitive natural communities and no mitigation is required.

Estuary

The effects of changes to water surface elevations on coastal and freshwater marsh and riparian vegetative communities along the shoreline of the Estuary is difficult to predict, as it is subject to several factors, such as river mouth closures, tide cycles, and wave action. However, the plant species that inhabit the Estuary shoreline are adapted to dynamic conditions. The Proposed Project and No Project 2 Alternative may influence the inundation rate of the Estuary during the lagoon management period by reducing the river flows entering the Estuary over Baseline Conditions and the No Project 1 Alternative. However, the range of shoreline inundation would not change. It is anticipated that conditions resulting from the Proposed Project and No Project 1 and No Project 2 alternatives would be consistent with the range of Baseline Conditions in the Estuary. As a result there would be no impact to the coastal and freshwater marsh and riparian communities in the Estuary.

Waters and Wetlands

Impact 4.4.2: Changes in minimum instream flows could adversely affect federal and state jurisdictional waters. (No Impact)

The potential effects of the Proposed Project and No Project 1 and No Project 2 alternatives on sensitive freshwater marsh, which would be considered wetlands, was addressed in Impact 4.4.1. This discussion focuses on waters (i.e., open waters of the Russian River and Dry Creek).

The boundaries of waters of the United States and waters of the State are determined by the ordinary high water mark.² The ordinary high water in the Russian River and Dry Creek is determined by winter flood events that reset and re-work the conformation of the stream bottom during high winter flows. The conformation of the stream bottom is not affected by the non-channel forming summer flows and would not be altered by changes Fish Flow Project. The Proposed Project and No Project 1 and No Project 2 alternatives would not affect the ordinary high water boundary differently than it is already affected under Baseline Conditions. Also, the operations of Lake Mendocino and Lake Sonoma would be within the existing range of water

² Ordinary high water is an approach for identifying the lateral limits of non-wetland waters. It is defined in 33 CFR Part 328.3 as a line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, or the presence of litter and debris.

level fluctuations with the same high water limit (refer to Impact 4.4.1 above for further details). Therefore, no net change in the extent of federal and state jurisdictional waters is anticipated and there would be no impact.

Wildlife Movement Corridors and Nursery

Impact 4.4.3: Changes in water surface elevations could interfere with wildlife movement or impede the use of nursery sites. (Less than Significant)

Implementation of a project alternative that could potentially result in slight changes in vegetation community composition would not alter the ability of animals to move within the project area's aquatic and wetland habitats. The Proposed Project and No Project 1 and No Project 2 alternatives minimum instream flow requirements would maintain perennial flows and maintain wetland communities in the Russian River and Dry Creek (refer to Impact 4.4.1). There would be no potential significant impact on the movement of wildlife along the Russian River and Dry Creek, and around Lakes Mendocino and Sonoma.

There could be some adverse change in the availability of freshwater marsh for amphibian breeding (nursery) sites. Foothill yellow-legged frog tadpoles and juvenile frogs use shallow waters and shoreline habitat for rearing. Hatchling western pond turtles likely use vegetated shorelines for cover and foraging. As discussed in Impact 4.4.1, the wetland communities where nursery sites may occur may have a slight shift in the distribution in wetland vegetation, but no net loss of wetlands, and hence no net loss of amphibian and reptile nursery sites. The potential impact would be less than significant and no mitigation is required.

Special-Status Plant and Wildlife Species

Impact 4.4.4: Changes to minimum instream flows and water levels could adversely affect special-status plant and wildlife species. (Less than Significant)

Although a number of special-status plant and wildlife species are known to or have the potential to occur within the project area, few could be adversely affected by the Proposed Project and No Project 1 and No Project 2 alternatives. This discussion focuses on the plant and wildlife species summarized in Tables 4.4.4 and 4.4.5 with a moderate to high potential to occur in the project area and are primarily associated with open water (aquatic), freshwater marsh, and riparian habitats. No impacts on the remaining species with a moderate to high potential to occur in the project area are anticipated because their specific habitat needs are outside of the area that would potentially be impacted. Impacts on special-status plant and wildlife species with the potential to be adversely affected are discussed below by location within the project area or, where appropriate, by groups of species with similar life histories.

Lake Mendocino and Lake Sonoma

Changes in Lake Mendocino and Lake Sonoma water surface elevations are unlikely to affect special-status plant and wildlife species. Fluctuating water levels are a normal operating pattern of reservoirs like Lake Mendocino and Lake Sonoma. Most species listed in Tables 4.4.4 and 4.4.5 do not occur in areas that would experience changes in water-surface elevations at Lake Mendocino and Lake Sonoma, which are largely unvegetated shoreline below the high water mark. Special-status wildlife that may utilize the reservoirs for foraging, rest, and cover include

western pond turtle, shorebirds, diving birds, raptors, and bats. Wildlife species that occur in and around the reservoirs would experience the existing fluctuating water levels under Baseline Conditions. The Proposed Project and No Project 1 and No Project 2 alternatives would result in changes in water levels that would be similar to the range in seasonal water surface elevation changes under Baseline Conditions and would have negligible effects on wildlife (see Impact 4.4.1). As a result, there would be no impact from changes in reservoir water surface elevations on special-status species.

Russian River and Dry Creek

Rivers and creeks are complex, dynamic ecosystems, normally experiencing changes between seasons, between years, and between different places within a waterway. Plant and wildlife species within these systems are adapted to fluctuating environmental conditions. For these reasons, minor shifts in aquatic and wetland habitats are not expected to result in a substantial adverse effect on special-status plants and wildlife potentially occurring within these habitats.

Special-status plant species associated with freshwater marsh and riparian habitats along the Russian River and Dry Creek, including Sonoma alopecurus, Bolander's reed grass, swamp harebell, bristly sedge, deceiving sedge, Koch's cord moss, coast fawn lily, minute pocket moss, Baker's meadowfoam, Harlequin lotus, Point Reyes checkerbloom, and North Coast semaphore grass, could be potentially affected by changes in minimum instream flows, although there are no reports of these species within the project area. These plant species are associated with low energy wet environments, at lake margins, in bogs, fens, and swamps, supported by slow moving or stagnant water. Occasionally wetland and marsh species are found along rivers and streams, but usually are found farther up the watershed in tributary streams. Marsh and riparian habitats along the Russian River and Dry Creek regularly experience inundation and flow velocities that would be anticipated to preclude the presence of these species. As discussed in Impact 4.4.1 it is predicted that a slight shift in the distribution in wetland vegetation may occur from the project alternatives in the Russian River and Dry Creek project areas, but no net loss of wetlands is anticipated. This would result in no impact to special-status plants.

There are several special-status wildlife species that use, or may use, the open water and freshwater marsh (shoreline) habitats of the project area (Table 4.4.5). Several bird species roost and/or forage in the Russian River and Dry Creek, such as various wading birds (great egret, great blue heron), water birds (double-crested cormorant), and raptors (peregrine falcon, bald eagle, osprey, northern harrier). Several bat species (pallid bat, Townsend's big-eared bat, western red bat, hoary bat) may forage for insects over open water. Western pond turtle is a year-round resident of the Russian River and Dry Creek and forage and bask in pools with slow-moving water.

Special-status wildlife could be affected by shifts in aquatic and shoreline habitats from the Proposed Project and the No Project 1 and No Project 2 alternatives, as described in Impact 4.4.1. Although the adaptation of habitat in the Russian River and Dry Creek, and its use by wildlife, cannot be precisely predicted, the changes in habitats from the project alternatives represent a range of variation already experienced by wildlife under to Baseline Conditions. As

a result the Proposed Project and No Project 1 and No Project 2 alternatives would have a less-than-significant impact on special-status wildlife and no mitigation is required.

Also, riparian habitats may be used for nesting and roosting by several special status bats and raptors (e.g. Cooper's hawk, golden eagle), white-tailed kite, yellow warbler, yellow-breasted chat, and tricolored blackbird; however, riparian habitats are not anticipated to be impacted by the Proposed Project and No Project 1 and No Project 2 alternatives, as discussed in Impact 4.4.1.

Estuary

Special-status wildlife species, including pinnipeds such as harbor seals, which inhabit the Estuary project area are adapted to dynamic conditions, including seasonal river flooding, wave action, and tidal cycles. Also, California brown pelican and American white pelican forage in the Estuary, as well as many birds mentioned above. As discussed in Impact 4.4.1, the Proposed Project and No Project 2 Alternative may influence the rate at which water surface elevations of the Estuary rise during the lagoon management period by reducing the minimum instream flows into the Estuary over Baseline Conditions and the No Project 1 alternative. However, the range of shoreline inundation and open water foraging habitat resulting from the Proposed Project and No Project 1 and No Project 2 alternatives would be consistent with the range of Baseline Conditions in the Estuary. The change in rate at which water surface elevations of the Estuary rise into the Estuary would be consistent with the existing range of water fluctuations in the Estuary and is not anticipated to special-status species or impact pupping, resting, or foraging pinnipeds or foraging water birds and there would be no impact.

4.4.5 General Plans and Consistency

Mendocino County General Plan

The Mendocino County General Plan (Mendocino County, 2009) sets forth the following goals, policies, and actions related to vegetation and wildlife that are applicable to the Proposed Project.

Resource Management Goals, Policies, and Actions

Goal RM-7 (Biological Resources): Protection, enhancement and management of the biological resources of Mendocino County and the resources upon which they depend in a sustainable manner.

Policy RM-71: Promote land uses and management practices that protect biological diversity and productivity.

Policy RM-75: Protection of existing sensitive resources is the highest priority. Onsite replacement or offsite replacement, protection or enhancement is less desirable.

Policy RM-77: Maintain resource diversity and integrity by protecting and enhancing continuous resource corridors compatible with adjacent uses through project design.

Policy RM-78: Conserve native vegetation, critical habitats and soil resources through education, technical and financial assistance, cooperative endeavors, best management practices, and soils and vegetation management plans for development and resource uses.

Policy RM-79: Encourage farmers, land owners and property managers to protect sensitive environments, and minimize the effects of recreation, tourism, agriculture and development on these resources. Promote techniques and features such as:

- Habitat contiguity,
- Wildlife corridors,
- Maintaining compatibility with adjacent uses,
- Maintaining habitat for sensitive plant and animal species.

Action Item RM-79.1: Work with agencies and organizations to educate the public about effective ways to protect listed plant and animal species and preserve sensitive habitats.

Policy RM-89: Conserve and enhance watercourses to protect habitat, fisheries, soils, and water quality.

The Proposed Project appears to be consistent with Mendocino County General Plan goals, objectives, and policies. The Proposed Project does not involve construction of new facilities, which could impact vegetation and wildlife. Also, the Proposed Project would have less than significant impact on riparian and wetland habitats, sensitive plant and wildlife species, wildlife corridors, and riparian corridors (see Impacts 4.4.1, 4.4.3 and 4.4.4) and, therefore, would be consistent with goals, policies, and actions listed above.

Sonoma County General Plan

The project area is located within portions Sonoma County. The following section lists goals, policies and objectives related to the Proposed Project's vegetation and wildlife resources from Sonoma County General Plan 2020 (PRMD, 2012) and ends with a brief analysis discussing consistency with this plan.

Goal OSRC-7: Protect and enhance the County's natural habitats and diverse plant and animal communities.

Objective OSRC-7.1: Identify and protect native vegetation and wildlife, particularly occurrences of special status species, wetlands, sensitive natural communities, woodlands, and areas of essential habitat connectivity.

Objective OSRC-7.4: Where appropriate, support regulatory efforts by other agencies to protect biotic habitat.

Objective OSRC-7.5: Maintain connectivity between natural habitat areas.

GOAL OSRC-8: Protect and enhance Riparian Corridors and functions along streams, balancing the need for agricultural production, urban development, timber and mining operations, and other land uses with the preservation of riparian vegetation, protection of water resources, flood control, bank stabilization, and other riparian functions and values.

Objective OSRC-8.1: Designate all streams shown on USGS 7.5 minute quadrangle topographic maps as of March 18, 2003, as Riparian Corridors and establish streamside conservation areas along these designated corridors.

Objective OSRC-8.2: Provide standards for land use and development in streamside conservation areas that protect riparian vegetation, water resources and habitat values while considering the needs of residents, agriculture, businesses and other land users.

Objective OSRC-8.3: Recognize and protect riparian functions and values of undesignated streams during review of discretionary projects. The following policies shall be used to achieve these objectives:

Policy OSRC-8a: Classify “Riparian Corridors” designated in the Open Space and Resource Conservation Element as follows:

(1) “Russian River Riparian Corridor” is the corridor adjacent to the main stem of the Russian River, excluding lands located within the Urban Residential, Commercial, Industrial, or Public-Quasi Public land use categories or within the jurisdiction of a city.

(2) “Flatland Riparian Corridors” are the corridors adjacent to designated streams in the 1989 General Plan that flow through predominantly flat or very gently sloping land, generally with alluvial soil. This classification excludes areas located within the “Russian River Riparian Corridor” or within the Urban Residential, Commercial, Industrial, or Public/Quasi-Public land use categories.

(3) “Other Riparian Corridors” are the corridors adjacent to all designated streams not Policy OSRC-8b: Establish streamside conservation areas along both sides of designated Riparian Corridors as follows, measured from the top of the higher bank on each side of the stream as determined by PRMD: (1) Russian River Riparian Corridor: 200' (2) Flatland Riparian Corridors: 100' (3) Other Riparian Corridors: 50'* Policy OSRC-8c: Continue to utilize the Biotic Resources combining district for all lands within the designated streamside conservation areas. Develop and adopt regulations establishing standards applicable to Riparian Corridors along designated streams consistent with Policies OSRC-8d and OSRC-8e. Until the regulations are adopted, require that land use and development comply with Policies OSRC-8d and OSRC-8e.*

Policy OSRC-8f: Develop and/or adopt, where appropriate, revised streamside specific standards, guidelines, and/or best management practices that provide for protection of Riparian Corridors by watershed, stream, or other geographic

areas. Once adopted, the revised standards would replace the standards that are in effect at the time.

Policy OSRC-8h: Where additional Riparian Corridors are designated in Area Plans, revise such plans and guidelines as needed to provide protection of riparian corridors equivalent to or better than the protection provided by the General Plan.

Policy OSRC-8i: As part of the environmental review process, refer discretionary permit applications near streams to CDFG and other agencies responsible for natural resource protection.

Policy OSRC-8j: Notify permit applicants of possible Federal and State permit requirements in areas near streams and notify landowners whose property overlaps or touches a designated Riparian Corridor regarding the public hearings on the proposed regulations affecting them.

Policy OSRC-8n: Work with the Sonoma County Water Agency and other entities to identify all streams with “bed-and-bank” channels and consider Riparian Corridor designation for all such streams.

The Proposed Project appears to be consistent with Sonoma County General Plan 2020 goals, objectives, and policies. The Proposed Project does not involve construction of new facilities, which could impact vegetation and wildlife. Also, the Proposed Project would have less than significant impact on riparian and wetland habitats, sensitive plant and wildlife species, and riparian corridors (see Impacts 4.4.1, 4.4.3 and 4.4.4) and, therefore, would be consistent with Goals OSRC-7 and 8 described above.

Also, the Proposed Project would not involve any prohibited activity under Articles 65 (Riparian Corridor Combining Zone), 66 (Biotic Habitat Combining Zone) of the Sonoma County zoning code, which restrict certain construction activities that could impact riparian corridors or protected trees.

4.4.6 References

- Baldwin, B. G. (2012). *The Jepson Manual, 2nd Edition*. Berkeley and Los Angeles: University Of California Press.
- Barbour, M. G., Keeler-Wolf, T., & Schoenherr, A. A. (2007). *Terrestrial Vegetation of California* (3rd ed.). Berkeley: University of California Press.
- Beedy, E. C., & Hamilton, W. I. (1999). *The Birds of North America*. Philadelphia: The Birds of North America, Inc.
- Bulger, J. B., Scott, N. J., & Seymour, R. B. (2003). Terrestrial activity and conservation of adult California red-legged frogs (*Rana aurora draytonii*) in coastal forests and grasslands. *Biological Conservation*, 110:85-95.
- Burrige, B. (1995). *Sonoma County Breeding Bird Atlas*. Santa Rosa: Madrone Audubon Society, Inc.
- California Native Plant Society, R. P. (2016, May 2). Inventory of Rare and Endangered Plants (online edition, v8-02). Sacramento, CA, USA.
- CDFW. (2016a). Occurrence Report. *California Natural Diversity Database*. Sacramento: California Department of Fish and Wildlife.
- CDFW. (2016b). Special Animals List. *California Natural Diversity Data Base*. Sacramento: California Department of Fish and Wildlife.
- Cook, D. G., & Jennings, M. R. (2007). Microhabitat use of the California red-legged frog and introduced bullfrog in a seasonal marsh. *Herpetologica*, 430-440.
- Cook, D. G., & Martini-Lamb, J. (2004). Distribution and habitat use of Pacific pond turtles in a summer impounded river. *Transactions of the Western Section of The Wildlife Society*, 84-89.
- Cook, D. G., White, S., White, P., & White, E. (2011). *Rana boylei* (Foothill yellow-legged frog) upland movement. *Herpetological Review*, 325-326.
- Environmental Science Associates. (2010). *Russian River Estuary Management Project*. Santa Rosa: Sonoma County Water Agency.
- Grewell, B. (2012a). Ludwigia. *The Jepson Manual: Vascular Plants of California, 2nd*. (B. G. Baldwin, D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rossati, & D. H. Wilken, Eds.) Berkeley: University of California Press.
- Grewell, B. (2012b, July 6). USDA Aquatic Weed Researcher. (K. Foster, Interviewer)
- Grewell, B., Netherland, M., & Skaer Thomason, M. (2016). *Establishing Research and Management Priorities for Invasive Water Primroses (Ludwigia spp.)*. Environmental

- Laboratory, Vicksburg, MS: ERD/EL TR-16-2, US Army Corp of Engineers Research and Development Center.
- Holland, R. F. (1986). *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Nongame-Heritage Program. Sacramento: State of California, The Resources Agency, Department of Fish and Game.
- Holland, R. F. (1990). *California Vegetation 4th edition*. San Luis Obispo: California Polytechnic State University.
- Jennings, M. R., & Hayes, M. P. (1988). *Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylei*)*. *Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America, USDA* (pp. 144-158). Forest Service General Technical Report RM-166.
- Jennings, M. R., & Hayes, M. P. (1990). *Status of the California red-legged frog, *Rana aurora draytonii*, in the Pescadero Marsh Natural Reserve*. Sacramento: California Department of Parks and Recreation.
- Jennings, M. R., & Hayes, M. P. (1994). *Amphibian and reptile species of special concern in California, Final Report*. Sacramento: California Department of Fish and Game, Inland Fisheries Division.
- Malanson, G. (1993). *Riparian Landscapes*. Cambridge: Cambridge University Press.
- Martini-Lamb, J., & Pecharich, A. (2016). *Russian River Estuary Management Project, Marine Mammal Project Act incidental harrassment authorization, report of activities and monitoring results - January 1 to December 31, 2015*. Santa Rosa: Sonoma County Water Agency.
- Martini-Lamb, J., Luna, M., & Mortenson, J. (2009). *Russian River Estuary Management Activities – Pinniped Monitoring Plan*. Santa Rosa: Sonoma County Water Agency.
- Mendocino County. (2009). *Mendocino County General Plan 2009*. Ukiah, CA: Mendocino County Planning and Building Department.
- NatureService. (2016, April 26). *Dubiraphia giulianii - (Van Dyke, 1949)*. Retrieved from NatureService Explorer:
<http://explorer.natureserve.org/servlet/NatureServe?searchName=Dubiraphia+giulianii>
- NMFS. (2011, March 8). Takes of marine mammals incidental to specific activities; Russian River Estuary management activities. 14924-14942. National Marine Fisheries Service: Federal Register.
- Ornduff, R., Faber, P. M., & Wolf, T. K. (2003). *Introduction to California plant life*. Berkeley: University of California Press.

Vegetation and Wildlife

- Poor Pocket Moss Recovery Team. (2001). *Recovery Strategy for poor pocket moss (Fissidens paupercaulus M. Howe) in British Columbia*. Victoria: B.C. Ministry of Environment.
- PRMD. (2012). *Sonoma County General Plan 2020*. Santa Rosa: Sonoma County Permit and Resource Management District.
- Remsen, J. J. (1978). *Bird Species of Special Concern in California*. Sacramento: California Department of Fish and Game.
- Riparian Habitat Joint Venture. (2004). *The riparian bird conservation plan: a strategy for reversing the decline of riparian associated birds in California*. Stinson Beach: California Partners in Flight.
- SCWA & Stewards. (2016). *Russian River Estuary Management Project Pinniped Monitoring Plan. R e v i s e d*. Stewards of the Coast and Redwoods. Santa Rosa: Sonoma County Water Agency.
- SCWA. (2010). Vegetation Mapping Dataset. Santa Rosa, CA, USA: Sonoma County Water Agency.
- Shaffer, H. B., Fellers, G. M., Voss, S. R., Olivers, J. C., & Pauly, G. B. (2004). Species boundaries, phylogeography and conservation genetics of the red-legged frog (*Rana aurora/draytonii*) complex. *Molecular Ecology*, 2667-2677.
- Sonoma County Agricultural and Open Space District. (2016, April 21). *Sonoma County Veg Map*. Retrieved from 1942 and 2011 aerials of the Santa Rosa Plain:
<http://sonomavegmap.org/1942/?appid=204eaae5687f4ff9886afc66a2289877#>
- Stebbins, R. C. (2003). *Field Guide to Western Reptiles and Amphibians* (3rd ed.). New York: Houghton Mifflin Company.
- Storer, T. I. (1925). *A synopsis of the amphibia of California*. Berkeley: University of California Press.
- Thomason Skaer, M. J., Grewell, B. J., & Netherland, M. D. (2016). *Hydrologic Variation Drives Invasive Plant Spread dynamics at Three Spatial Scales in a Managed River*. Davis: USDA Agricultural Research Service, Exotic and Invasive Weed Research Unit, University of California.
- TMMC. (2016, April 21). *Current Patients*. Retrieved from The Marine Mammal Center:
<http://www.marinemammalcenter.org/patients/current-patients-page/>
- USFWS. (2002). *Recovery Plan for the California Red-legged frog (Rana aurora draytonii)*. United States Fish and Wildlife Service. Portland, Oregon: U.S. Fish and Wildlife Service.

- USFWS. (2010, March 17). Endangered and threatened wildlife and plants; revised designation of critical habitat for the California red-legged frog. 12816-12959. U.S. Fish and Wildlife Service.
- USFWS. (2015a, April 10). Endangered and threatened wildlife and plants: 90-day findings on 10 petitions. 19259-19263. U.S. Fish and Wildlife Service.
- USFWS. (2015b, September 18). Endangered and threatened wildlife and plants; 90-day findings for 25 petitions. 56423-56432. U.S. Fish and Wildlife Service.
- USFWS. (2015c). Endangered and threatened wildlife and plants; 90-day findings for 31 petitions. 37568-37579. U.S. Fish and Wildlife Service.
- USFWS. (2016a, April 26). Giuliani's Dubiraphian riffle beetle (*Dubiraphia giulianii*). U.S. Fish and Wildlife Service. Retrieved from ECOS Environmental Conservation Online: http://ecos.fws.gov/tess_public/profile/speciesProfile?spcode=I0C8#status
- USFWS. (2016b, March 23). Official Species List. Arcata, CA, USA: US Fish and Wildlife Service, Arcata Fish and Wildlife Office.
- USFWS. (2016c). Official Species List. Sacramento: U.S. Fish and Wildlife Service, Sacramento Field Office.
- USGS. (2016). *USGS North American Breeding Bird Atlas*. (United States Geological Survey) Retrieved June 27, 2016, from Sonoma County: http://www.pwrc.usgs.gov/bba/index.cfm?fa=explore.ProjectHome&BBA_ID=CA-Son2011
- Warner, R. a. (1984). *California Riparian Systems, Ecology, Conservation, and Productive Management*. Berkeley and Los Angeles: University of California Press.
- Zeiner, D. C., Laudenslayer, W. J., Mayer, K. E., & White, M. (1988). *California's Wildlife. Vol. I: Amphibians and Reptiles*. Sacramento: California Department of Fish and Game.
- Zeiner, D. C., Laudenslayer, W. J., Mayer, K. E., & White, M. (1990a). *California's Wildlife. Vol. II: Birds*. Sacramento: California Department of Fish and Game.
- Zeiner, D. C., Laudenslayer, W. J., Mayer, K. E., & White, M. (1990b). *California's Wildlife. Vol. III: Mammals*. Sacramento: California Department of Fish and Game.