

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

**Klamath River Renewal Corporation
PacifiCorp**

**Project Nos. 14803-001;
2082-063**

**AMENDED APPLICATION FOR SURRENDER OF LICENSE FOR MAJOR
PROJECT AND REMOVAL OF PROJECT WORKS**

Attachment A-3

Lower Klamath Project Biological Assessment

**Appendix B
(Species Considered and Excluded from
Further Consideration in the Biological Assessment)**



Biological Assessment

Appendix B - Species Considered and Excluded from Further Consideration in the Biological Assessment

March 2021


**KLAMATH
RIVER RENEWAL**
CORPORATION

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B. SPECIES CONSIDERED AND EXCLUDED FROM FURTHER CONSIDERATION IN THE BA

Several federally listed species were identified as having the potential to occur in the Action Area. The species covered in this appendix were considered and excluded from further consideration in the Biological Assessment because they do not occur in the Action Area (Table B-1). Other species evaluated (e.g., species that are not currently federally listed but may become listed before or during implementation of the Proposed Action) are shown in Table B-2. A summary of the life history and habitat associations for each species is provided following both tables, and an additional evaluation of potential effects to the non-listed species that may become listed before or during implementation of the Proposed Action is provided following Table B-2. As appropriate, conservation measures for non-listed species are also described.

References cited in this appendix are listed in Chapter 8 of the BA.

Table B-1: Listed Species Considered and Excluded from Further Consideration

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
Plants					
<i>Astragalus applegatei</i> (Applegate's milk vetch)	Endangered	None	A narrow endemic, known to occur only in southern Klamath County, Oregon, with four sites a few miles south of the city of Klamath Falls (USFWS 2018a). Documented during PacifiCorp surveys at Keno Reservoir. Elevation range: found at 4,100 feet (USFWS 2018a)	Flat, seasonally moist, strongly alkaline soils that are sparsely vegetated (USFWS 2018a).	Nearest species and habitat to the Action Area occur at Keno Reservoir, approximately 5.5 river miles north of the upstream end of the Hydroelectric Reach. There will be no work near known populations, and no activities that will introduce noxious weeds that could adversely affect known populations.
<i>Euphorbia hooveri</i> (Hoover's spurge)	Threatened	The closest designated critical habitat is 2,838 acres near the Deer Creek and Sacramento River confluence (approx. 135 miles southeast of Iron Gate Dam)	Scattered throughout Central Valley of California; 29 known occurrences in inland central California, including Butte, Colusa, Glenn, Merced, Stanislaus, Tehama, and Tulare counties. Elevation range: 80-820 feet (CNPS 2018)	Seasonally inundated areas such as vernal pools, remnant alluvial fans, depositional stream terraces (USFWS 2009a).	Based on habitat surveys and species requirements, no suitable habitat is present in the Action Area.
<i>Tuctoria greenei</i> (Greene's tuctoria)	Endangered	The closest designated critical habitat is a 2,979-acre area in eastern Shasta Co. (approx. 91 miles southeast of Iron Gate Dam)	Endemic to northern and central California, between Shasta Co. and Tulare Co., California. Elevation range: 100-3,500 feet (CNPS 2018)	Relatively shallow portions of vernal pools (USFWS 2005b)	Based on habitat surveys and species requirements, no suitable habitat is present in the Action Area.

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
<i>Fritillaria gentneri</i> (Gentner's fritillary)	Endangered	None	Restricted to a few localities in southwest Oregon, all within a 30-mile radius around Jacksonville, Oregon (USFWS 2003, 2018a). Elevation range: 3,297–3,675 feet (CNPS 2018)	Chaparral and cismontane woodland; soils sometimes serpentinite (CNPS 2018).	Species was not found during focused surveys in the Action Area. Nearest population is approximately 3 miles from where project activities will occur. Habitat is present along the outer edge of the 1.5-mile buffer around Copco and Iron Gate reservoirs; however, no activities are planned in the vicinity. There will be no work near known populations, and no activities that will introduce noxious weeds that could adversely affect known populations.
<i>Orcuttia tenuis</i> (Slender Orcutt grass)	Threatened	The closest designated critical habitat areas are in the Modoc and Shasta National Forests in Shasta, Modoc, and Siskiyou Counties (approx. 70 miles southeast of Iron Gate Dam)	Endemic to California's Central Valley and Modoc Plateau regions; Lake, Klamath, Jackson, Josephine counties in southern Oregon. Elevation range: 115-5,775 feet (CNPS 2018)	Vernal pools with prolonged inundation	Based on habitat surveys and species requirements, no suitable habitat is present in the Action Area.
<i>Phlox hirsuta</i> (Yreka phlox)	Endangered	None	Known from only five locations in and near Yreka, Siskiyou County, California (USFWS 2006b, CNPS 2018). Elevation range: 2,690–4,921 feet (CNPS 2018)	Serpentine barrens and montane coniferous forest in serpentinite soils and on talus (CNPS 2018).	Serpentine soil types that support the species do not occur within the 1.5-mile buffer surrounding the Hydroelectric Reach.

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
<i>Lilium occidentale</i> (western lily)	Endangered	None	Restricted to a narrow range of coastal habitat between Coos Bay, Oregon and Eureka, California. Suitable habitat may exist near the mouth of the Klamath River. Elevation range: 5-600 feet (CNPS 2018)	Early successional habitats such as coastal prairies, freshwater wetlands, forest fringes (USFWS 2009b)	Suitable habitat at mouth of Klamath River will not be impacted.
Invertebrates					
<i>Branchinecta conservatio</i> (Conservancy fairy shrimp)	Endangered	The closest designated critical habitat is near the border of Butte and Tehama counties in California (approx. 155 miles southeast of the Klamath River estuary)	Known to occur in isolated populations across southern California and the Central Valley	Large vernal pools in various different landforms, geologic formations, and soil types (USFWS 2005b)	Suitable habitat not present/impacted.
<i>Branchinecta lynchi</i> (vernal pool fairy shrimp)	Threatened	The closest designated critical habitat is 7,574 acres in Jackson Co., Oregon, north of Medford, Oregon (approx. 50 miles northwest of J.C. Boyle Reservoir)	Known to occur in Jackson Co., Oregon and in scattered locations across central California south to Ventura Co., California (USFWS 2005b)	Ephemeral freshwater habitats such as vernal pools and seasonal wetlands	Suitable habitat not present/impacted.

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
<i>Lepidurus packardii</i> (vernal pool tadpole shrimp)	Endangered	The closest designated habitat is south of Lake Shasta, adjacent to the Sacramento River (approx. 105 miles south of Iron Gate Dam)	Scattered distribution across Central Valley of California, from Shasta Co. south to Tulare Co. (USFWS 2005b)	Ephemeral freshwater habitats such as vernal pools and seasonal wetlands (USFWS 2005b)	Suitable habitat not present/impacted.
Fish					
<i>Eucyclogobius newberryi</i> (tidewater goby)	Endangered	The closest designated critical habitat is near Lake Talawa (21 miles) north of the Klamath River estuary, Stone Lagoon (21 miles) south of the Klamath River estuary, and Big Lagoon (23 miles) south of the Klamath River estuary. (USFWS 2008b)	Tillas Slough (mouth of the Smith River, Del Norte County) to Agua Hedionda Lagoon (northern San Diego County).	Coastal lagoons and the uppermost zone of brackish large estuaries; found in water less than 3 feet deep and salinities less than 12 parts per thousand (ppt) (USFWS 2005a).	Species not documented in Proposed Action, and the only potential suitable habitat in the Klamath River and estuary may be in tributaries to the estuary (L. Roberts, Biologist, USFWS Fish and Wildlife, pers. comm., June 14, 2011). The sediment release is not expected to impact these tributaries; therefore, the effects of the Project are not expected to overlap with the species or designated critical habitat.

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
Amphibians					
Reptiles					
<i>Caretta caretta</i> (loggerhead turtle)	Threatened	None	Warm waters of the Pacific coast, primarily from the Channel Islands south; does not nest in California. The presence of loggerhead turtles in the North Pacific and in Baja California is likely a result of developmental migrations from the main nesting areas in Japan (Bowen et al. 1995).	Uses the open ocean near-shore zone; nests on high-energy, relatively narrow, steep coarse-grained beaches. Loggerheads are circumglobal, inhabiting continental shelves, bays, estuaries, and lagoons in the temperate, subtropical, and tropical waters of the Atlantic, Pacific and Indian oceans (Dodd 1988).	The effects of the Proposed Action are outside of the preferred distribution of the species.
<i>Chelonia mydas</i> (green turtle)	Threatened	Designated in Culebra Island, Puerto Rico (NMFS 2011)	Warm waters of the Pacific coast, primarily from San Diego south. Uncommon along the California coast (California Herps 2011); does not nest in California.	Uses convergence zones in the open ocean and benthic feeding grounds in coastal areas; nests on sandy ocean beaches, including beaches in small numbers in the U.S. Virgin Islands, Puerto Rico, Georgia, South Carolina, and North Carolina, and in larger numbers in Florida and Hawaii (NMFS 2011).	The effects of the Proposed Action are outside of the preferred distribution of the species.

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
<i>Dermochelys coriacea</i> (leatherback turtle)	Endangered	Designated in the coastal waters adjacent to Sandy Point, St. Croix, U.S. Virgin Islands (44 FR 17710) Proposed for designation includes the California coast from Point Arena to Point Vincente (200 miles south of the Klamath River estuary); and from Cape Flattery, Washington to the Umpqua River (Winchester Bay), Oregon (145 miles north of the Klamath River estuary) (75 FR 319).	Temperate and cool waters of the Pacific coast. Seasonal occurrences during summer and fall months along the Pacific coast result from the trans-Pacific migration from Western Pacific nesting beaches, when large aggregations of jellyfish form (77 FR 4169). Majority of occurrences are documented in central and southern California from boats out at sea, telemetry studies, and aerial surveys. Does not nest in California.	Pelagic, though also forages near coastal waters (NMFS 2011).	If species is present in the Pacific Ocean, off the Northern California coast, it is likely migrating through the area during the summer and fall months. Any effects on water quality from January– March will occur outside of the seasonal distribution of the species.

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
<i>Lepidochelys olivacea</i> (olive ridley turtle)	Threatened	None	Warm waters of the Pacific coast, primarily from southern California south (e.g., Point Loma, La Jolla, and Encinitas in San Diego County); however, species has been documented off Mendocino and Humboldt counties, and as far north as Oregon and possibly Alaska during warm-water El Niño years (California Herps 2011). Species does not nest in California.	Associated with the pelagic zone; however, has been documented along tropical coastal areas, including bays and estuaries; nests on sandy ocean beaches on the Pacific Coast of Mexico (NMFS 2011).	The effects of the Proposed Action are outside of the preferred distribution of the species.

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
Birds					
<i>Brachyramphus marmoratus</i> (marbled murrelet)	Threatened	Designated; closest critical habitat is approximately 62 miles west of Iron Gate Dam.	Nesting marbled murrelets in California are concentrated near coastal waters of Del Norte and Humboldt counties, and occur in lesser numbers near San Mateo and Santa Cruz counties. The species winters throughout its nesting range, and in small numbers in Southern California. There are no documented occurrences of the species in Siskiyou County and the nearest known occurrence to construction areas was documented approximately 76 miles west of Iron Gate Dam (CDFW 2021).	Marbled murrelets spend most of their lives on the ocean where they forage in nearshore areas. The species nests in coastal old-growth coniferous forests with suitable platforms.	Construction activities associated with the Proposed Action would occur outside the inland range of the species and would not occur within murrelet nesting habitat. Therefore, no effects from noise disturbance will occur to the species. Suspended sediment in the water column resulting from the Proposed Action will neither affect the species' nesting habitat nor its critical habitat where it overlaps the Klamath River approximately 75 miles southwest of Iron Gate Dam. Contamination of the species' prey base from flushing sediment is likely to be consistent with exposing aquatic biota to an "average" water column chemical concentration; with respect to bioaccumulation potential, there are no exceedances of applicable marine bioaccumulation screening levels (CDM 2011).

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
<i>Charadrius alexandrinus nivosus</i> (western snowy plover)	Threatened	The closest designated critical habitat is near Lake Talawa (21 miles north of the Klamath River estuary) and Big Lagoon (23 miles south of the Klamath River estuary). The closest proposed critical habitat is at Gold Bluffs Beach (7 miles north of the Klamath River estuary), Stone Lagoon (21 miles south of the Klamath River estuary), and near Lake Talawa (21 miles north of the Klamath River estuary) (76 FR 16046).	Nests in locations along Washington, Oregon, and California coasts (including Del Norte, Humboldt, and Mendocino counties) (USFWS 2007a). The nearest documented observation of potential nesting was at the Lower Klamath National Wildlife Refuge in 1978 (CDFW 2021).	Nests on barren to sparsely vegetated dune-backed beaches, barrier beaches, and salt- evaporation ponds, infrequently on bluff- backed beaches.	Effects from suspended sediment in the water column from the Proposed Action is not expected to affect this species, nesting habitat, or critical habitat, because suspended sediment will be deposited offshore. Contamination of prey base as a result of flushing sediment is likely to be consistent with exposing aquatic biota to an “average” water column chemical concentration; with respect to bioaccumulation potential, there are no exceedances of applicable marine bioaccumulation screening levels (CDM 2011).

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
<i>Coccyzus americanus</i> (yellow-billed cuckoo)	Threatened	Proposed critical habitats are at the Eel River estuary (approx. 63 miles south of Klamath River estuary) and areas adjacent to the Sacramento River between Red Bluff, California and Colusa, California	Limited to scattered locations in central and southern California, Arizona, and New Mexico. The nearest documented observation of nesting was along Big Springs Creek in Mt. Shasta in 1951 (CDFW 2021).	Low- to moderate-elevation forests near rivers and streams; require large (>20 hectares), contiguous areas of riparian forest (USGS 2009)	Suitable habitat not present/impacted.

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
<i>Phoebastria albatrus</i> (short- tailed albatross)	Endangered	None	During the non-breeding season, range along the continental shelf margins of the Pacific Rim from southern Japan to northern California (USFWS 2008c). Species does not nest in California.	North Pacific marine ocean. Foraging habitat includes regions of upwelling and high productivity (e.g., Gulf of Alaska, along the Aleutian Chain, and along the Bering Sea shelf break from the Alaska Peninsula out towards St. Matthew Island) (Suryan et al. 2007, Tickell 2000; both as cited in USFWS 2008c).	Outside of the preferred distribution for foraging. Contamination of prey base as a result of flushing sediment is likely to be consistent with exposing aquatic biota to an “average” water column chemical concentration; with respect to bioaccumulation potential, there are no exceedances of applicable marine bioaccumulation screening levels (CDM 2011).
Mammals					
<i>Martes caurina</i> (Pacific marten – Coastal Distinct Population Segment)	Threatened	None	Pacific marten historically ranged throughout coastal Oregon and coastal northern California. The species is currently limited to four small populations and is absent from the northern and southern ends of its historical range (USFWS 2018a). The nearest known population is the Northern Coastal California population that occurs in northwestern California (USFWS 2018a).	Older forests exhibiting the following characteristics: a mixture of old and large trees, multiple canopy layers, snags and other decay elements, dense understory development, and biologically complex structure and composition (USFWS 2018a)	Construction activities associated with the Proposed Action will occur outside the range of the species and will not affect habitat for the species. Therefore, no effects from noise disturbance or habitat modification will occur to the species.

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
<i>Lynx canadensis</i> (Canada lynx)	Threatened	Final; the nearest critical habitat is in WA, MT, and WY	Occurs across Canada from Pacific to Atlantic coasts. Also found in Alaska and isolated portions of some US states (CO, ID, ME, MI, MN, MT, NH, NY, OR, UT, VT, WA, WI, WY) (Ulev 2007)	Require early and mid-successional forests for hunting, and late-successional forests for breeding activities (Ulev 2007)	Suitable habitat not present/impacted.
<i>Balaenoptera borealis</i> (sei whale)	Endangered	None	Pacific Ocean; wide range of subtropical, temperate, and subpolar waters around the world. Species may migrate to higher latitudes during the summer and lower latitudes during the winter; however, this species is unpredictable (NMFS 2011).	Deep ocean waters far from the coastline (NMFS 2011).	Effects from suspended sediment in the water column from the Proposed Action are outside of the preferred distribution (deep ocean habitat).
<i>Balaenoptera musculus</i> (blue whale)	Endangered	None	The North Pacific population extends throughout the Pacific Ocean and includes deep ocean waters off California. In general, species migrate towards the subtropics in the fall and sub-polar areas in the spring; however, evidence suggests some individuals reside in areas year- round. (NMFS 2011)	Deep ocean offshore waters; also can be found in coastal waters (NMFS 2011).	Effects from suspended sediment in the water column from the Proposed Action are outside of the preferred distribution (deep ocean habitat).

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
<i>Balaenoptera physalus</i> (fin whale)	Endangered	None	Pacific Ocean; species is distributed year-round in a wide range of longitudes and latitudes, but primarily found in temperate to polar latitudes, and less commonly in the tropics. Specific migration patterns are complex; however, migration to foraging areas in high-latitude marine environments has been documented. (NMFS 2011)	Deep ocean waters (NMFS 2011).	Effects from suspended sediment in the water column from the Proposed Action are outside of the preferred distribution (deep ocean habitat).
<i>Eubalaena japonica</i> (North Pacific right whale)	Endangered	Designated critical habitat is in the North Pacific Ocean (Bering Sea and Gulf of Alaska) where feeding is known or believed to occur (73 FR 19000)	North Pacific right whales inhabit the Pacific Ocean, with recent sightings in sub-Arctic waters to the north, Bering Sea, central North Pacific, Hawaii, and south to Baja California. Continually found in the summer in Bristol Bay and Bering Sea. Migration is believed to occur from high-latitude feeding grounds in the summer to temperate waters during the winter; however, migratory patterns are unknown (NMFS 2011).	They primarily occur in coastal or shelf waters, and appear to follow prey, which consists of zooplankton, including copepods, euphausiids, and cyprids (NMFS 2011).	The effects of the Proposed Action are outside of the preferred distribution of the species.

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
<i>Megaptera novaengliae</i> (humpback whale)	Endangered	None	Pacific Ocean; the California/Oregon/Washington stock resides from southern British Columbia to California in the summer and fall; winters in Central America and Mexico (NMFS 2011).	Deep ocean waters (NMFS 2011).	Effects from suspended sediment in the water column from the Proposed Action are outside of the preferred distribution (deep ocean habitat) and seasonal occurrence for the species.
<i>Physeter macrocephalus</i> (sperm whale)	Endangered	None	Pacific Ocean between about 60°N and 60°S latitudes. California-Oregon-Washington stock have been documented in California year-round, and in Washington and Oregon from March through November. (NMFS 2011)	Deep ocean waters (NMFS 2011).	Effects from suspended sediment in the water column from the Proposed Action are outside of the preferred distribution (deep ocean habitat) for the species.

B.1 Applegate's Milk Vetch (*Astragalus applegatei*)

Applegate's milk-vetch (*Astragalus applegatei*) is a perennial herb in the pea family (Fabaceae) and was federally listed as endangered without critical habitat in 1993 (USFWS 2018c). This species is a narrow endemic, known to occur only in southern Klamath County, Oregon, with most occupied sites a few miles south of the city of Klamath Falls at an elevation of 4,100 feet (USFWS 2018c). It is found in flat, seasonally moist, strongly alkaline soils that are sparsely vegetated (USFWS 2018c). Applegate's milk-vetch was discovered during relicensing surveys within 45 to 100 feet of Keno Reservoir, outside the Action Area.

B.2 Hoover's Spurge (*Euphorbia hooveri*)

Hoover's spurge (*Euphorbia hooveri*) is an annual herb in the spurge family (Euphorbiaceae) that is endemic to large, deep vernal pools in California's Central Valley (USFWS 2009a). This species is restricted to scattered locations throughout the Central Valley. All reported occurrences are in or south of Tehama County, California. There are no documented occurrences of Hoover's spurge in the Action Area. Based on habitat surveys and species requirements, suitable vernal pool habitats are also not present in the Action Area.

B.3 Greene's Tuctoria (*Tuctoria greenei*)

Greene's tuctoria is a member of the grass family (Poaceae) that was federally listed as endangered in 1997 (62 FR 14338). This species is endemic to vernal pool ecosystems in northern and central California and is known to exist in localities across 10 counties in northern and central California, between Shasta County and Tulare County (USFWS 2005b). There are no documented occurrences of Greene's tuctoria in the Action Area. Based on habitat surveys and species requirements, suitable vernal pool habitats are also not present in the Action Area.

Critical habitat was designated as final in 2005. Critical habitat is not within the Action Area. The nearest critical habitat to the Action Area is a 2,979-acre area in eastern Shasta County (70 FR 46924).

B.4 Gentner's Fritillary (*Fritillaria gentneri*)

Gentner's fritillary was federally listed as endangered without critical habitat in 1993 (64 FR 69195). It is found in chaparral and cismontane woodland, and sometimes in serpentinite soils (CNPS 2018). This species is restricted to a few localities in southwest Oregon, all within a 30-mile radius around Jacksonville, Oregon (USFWS 2003, 2018a) at elevations of 3,297 to 3,675 feet (CNPS 2018). This species has also been observed at the Horseshoe Ranch Wildlife Area, which is part of the species' recovery Unit 4 (USFWS 2003). This population is outside of the Action Area and approximately 2.9 miles from where project activities will occur. The species was not found during focused surveys conducted in suitable habitat in the Action Area in 2019.

B.5 Slender Orcutt Grass (*Orcuttia tenuis*)

Slender Orcutt Grass is an annual semi-aquatic grass that is endemic to vernal pools across the Central Valley and Modoc Plateau regions of California and in southern Oregon. This species prefers large, deep vernal pools that are inundated for relatively long periods, and often occurs in the deepest parts of the pool (USFWS 2009c). No designated critical habitat occurs in the Action Area. This species is not known to occur in the Action Area. Based on habitat surveys and species requirements, suitable habitat is not present in the Action Area.

B.6 Yreka Phlox (*Phlox hirsuta*)

The Yreka phlox was listed as endangered without critical habitat in 2000 (65 FR 5268). It is known from only five locations in and near Yreka, Siskiyou County, California. This species grows on serpentine soils and on talus at elevations of 2,690 to 4,921 feet, in association with Jeffrey pine, incense cedar, and western juniper (USFWS 2006b, CNPS 2018). This species does not occur in the Action Area, and soil types that support the species are not present (NRCS 1983). The species was not found during special-status plant surveys conducted in the Action Area in 2018 and 2019.

B.7 Western Lily (*Lilium occidentale*)

Western Lily is a perennial member of the Liliaceae family that was federally listed as endangered without critical habitat in 1994 (94 FR 0162). It is restricted to a narrow range along the Pacific coast between Coos Bay, Oregon and Eureka, California (USFWS 2009b). This species is found in early successional habitats with wet soils such as coastal prairies, freshwater wetlands, and edges of forests. This species is not known to occur in the Action Area. There are no known historical observations of western lily at the mouth of the Klamath River, and the nearest known population is located 15 miles north of the river mouth at the Crescent City Marsh (C. Pogue, USFWS, pers. comm. March 9, 2018).

B.8 Conservancy Fairy Shrimp (*Branchinecta conservatio*)

The Conservancy fairy shrimp was listed as endangered in 1994 (59 FR 48153). Historically, the Conservancy fairy shrimp likely occurred throughout the Central Valley of California. Conservancy fairy shrimp populations are currently known from eight localities: Vina Plains, Tehama County; south of Chico, Butte County; Jepson Prairie and near the Potrero Hills, Solano County; Sacramento National Wildlife Refuge (NWR), Glenn County; Tule Ranch unit of the CDFW Yolo Basin Wildlife Area, Yolo County; the Mapes Ranch in Stanislaus County; Flying M Ranch, Ichord Ranch, and Virginia Smith Trust lands, Merced County; and Los Padres National Forest, Ventura County (USFWS 2005b).

Conservancy fairy shrimp inhabit ephemeral or temporary pools of somewhat turbid freshwater (vernal pools) that form in the cool, wet months of the year. The pools inhabited by the Conservancy fairy shrimp are typically large, such as the 36-hectare (89-acre) Olcott Lake at Jepson Prairie (59 FR 48153). There have

been no documented occurrences of Conservancy fairy shrimp in the Action Area, and no suitably large vernal pool complexes are present. Vernal pools were not observed during surveys conducted in the Action Area.

B.9 Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

The vernal pool fairy shrimp was listed as threatened in 1994 (59 FR 48136). It is likely the historical distribution of this species coincides with the historical distribution of vernal pools in California's Central Valley and southern Oregon. Holland (1998) found that although the current and historical distribution of vernal pools is similar, vernal pools are now far more fragmented and isolated from each other than during historical times, and currently occupy only about 25 percent of their former land area. Vernal pool fairy shrimp are currently known to occur in a wide range of vernal pool habitats in the southern and Central Valley areas of California, and in two vernal pool habitats in the "Agate Desert" area of Jackson County, Oregon. The vegetation and land use in its Oregon range are similar to those of northern California's inland valleys (USFWS 2005b).

In Oregon, the vernal pool fairy shrimp is found in two distinct vernal pool habitats on alluvial fan terraces associated with Agate-Winlo soils on the Agate Desert, and in the Table Rocks area on Randcore-Shoat soils underlain by lava bedrock (Helm and Fields 1998). There have been no documented occurrences of vernal pool fairy shrimp in the Action Area, and no suitable habitat is present based on surveys conducted in the Action Area.

B.10 Vernal Pool Tadpole Shrimp (*Lepidurus packardii*)

The vernal pool tadpole shrimp was listed as endangered in 1994 (59 FR 48153). Historically, the vernal pool tadpole shrimp was probably distributed over most of the vernal pool habitats across the Central Valley of California (USFWS 2005b). The species is currently distributed across the Central Valley and in the San Francisco Bay area, but it is uncommon even where vernal pool habitats occur. The largest concentration of vernal pool tadpole shrimp occurrences is found in the Southeastern Sacramento Vernal Pool Region, where the species occurs on a number of public and private lands in Sacramento County (USFWS 2005b).

There have been no documented occurrences of vernal pool fairy shrimp in the Action Area, and no suitable habitat is present based on surveys conducted in the Action Area.

B.11 Tidewater Goby (*Eucyclogobius newberryi*)

The tidewater goby was listed as endangered in 1994 (59 FR 5494) and reclassified as threatened in 2014 (79 FR 14340). In total, approximately 12,156 acres (4,920 hectares) in Del Norte, Humboldt, Mendocino, Sonoma, Marin, San Mateo, Santa Cruz, Monterey, San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Orange, and San Diego counties, California, fall within the boundaries of the 2013 critical habitat designation. The Klamath River and its estuary have not been designated as critical habitat for this species.

Tidewater gobies are a small, short-lived, estuarine/lagoon adapted species that may infrequently disperse via marine habitat, but with no dependency on marine habitat for its life cycle (Swift et al. 1989, Lafferty et al. 1999). Reproduction and spawning typically occurs during spring and summer in slack shallow waters of seasonally disconnected or tidally muted lagoons, estuaries, and sloughs. There are no documented catches of tidewater gobies in the Action Area. This species is unlikely to inhabit the mainstem Klamath River due to the high winter and spring flows, which would greatly exceed its preferred habitat criteria.

B.12 Loggerhead Turtle (*Caretta caretta*)

The loggerhead turtle was listed as threatened throughout its range in 1978 (43 FR 32800). Critical habitat is currently not designated. It inhabits the warm waters of the Pacific coast, primarily from the Channel Islands south, but does not nest in California. The presence of loggerhead turtles in the North Pacific and in Baja California is likely a result of developmental migrations from the main nesting areas in Japan (Bowen et al. 1995). This species uses the open ocean nearshore zone, and nests on high-energy, relatively narrow, steep, coarse-grained beaches. Loggerheads are circumglobal, inhabiting continental shelves, bays, estuaries and lagoons in the temperate, subtropical, and tropical waters of the Atlantic, Pacific, and Indian oceans (Dodd 1988). It forages on whelks and conches. The Action Area is outside of the preferred distribution of the species.

B.13 Green Turtle (*Chelonia mydas*)

The green turtle was listed as threatened throughout its range in 1978 (43 FR 32800). Critical habitat for this species is designated in Culebra Island, Puerto Rico. It inhabits the warm waters of the Pacific coast, primarily from San Diego south, but does not nest in California. It is uncommon along the California coast. This species uses convergence zones in the open ocean and benthic feeding grounds in coastal areas. It forages on seagrasses and algae. It nests on sandy ocean beaches. The Action Area is outside of the preferred distribution of the species.

B.14 Leatherback Turtle (*Dermochelys coriacea*)

The leatherback turtle was listed as endangered in 1970 (35 FR 8491). Critical habitat was designated in the coastal waters adjacent to Sandy Point, St. Croix, U.S. Virgin Islands (44 FR 17710). Critical habitat is currently proposed for designation along the California coast from Point Arena to Point Vicente (200 miles south of the Klamath River estuary); and from Cape Flattery, Washington to the Umpqua River (Winchester Bay), Oregon (145 miles north of the Klamath River estuary). This species inhabits the temperate and cool waters of the Pacific coast. Seasonal occurrences during summer and fall months along the Pacific coast result from the trans-Pacific migration from Western Pacific nesting beaches, when large aggregations of jellyfish form. It is a pelagic species, although it also forages near coastal waters. Its diet includes soft-bodied animals, such as jellyfish and salps. The majority of occurrences are documented in central and southern California from boats out at sea, telemetry studies, and aerial surveys. This species does not nest

in California. If the species is present in the Pacific Ocean, off the Northern California coast, it is likely migrating through the area during the summer and fall months.

Designated critical habitat for this species is more than 100 miles to the north and south of the Klamath River mouth.

B.15 Olive Ridley Sea Turtle (*Lepidochelys olivacea*)

The olive ridley sea turtle was listed as threatened throughout its range in 1978 (43 FR 32800). Critical habitat is currently not designated. It inhabits the warm waters of the Pacific coast, primarily from southern California south (e.g., Point Loma, La Jolla, and Encinitas in San Diego County). However, this species has been documented off Mendocino and Humboldt counties, and as far north as Oregon and possibly Alaska during warm-water El Niño years. It is associated with the pelagic zone, but has been documented along coastal areas, including bays and estuaries. It nests on sandy ocean beaches and forages on algae, lobster, crabs, tunicates, mollusks, shrimp, and fish. It does not nest in California. The Action Area is outside of the preferred distribution of the species.

B.16 Marbled Murrelet (*Brachyramphus marmoratus*)

The marbled murrelet was listed as threatened in 1992 (57 FR 45328). Critical habitat was designated for the species in 1996 (61 FR 26256) and revised in 2011 (76 FR 61599). The nearest portion of designated critical habitat is approximately 62 miles west of Iron Gate Dam. Nesting murrelets in California are concentrated near the coastal waters of Del Norte and Humboldt counties, and occur in lesser numbers near San Mateo and Santa Cruz counties. The species winters throughout its nesting range and in small numbers in southern California. It spends most of its time on the ocean, but nests inland in old-growth conifers with suitable platforms, especially coastal redwood forests. Murrelets are known to travel up to 55 miles inland to reach suitable nesting habitat in the northern part of their range (i.e., in the Pacific Northwest); however, inland distances narrow in the southern portion of the species' range (Raphael et al. 2018). The known inland limits of marbled murrelet nests and occupied sites in Oregon and California are 47 miles and 24 miles respectively (Raphael et al. 2018).

Although murrelet nesting habitat is present downstream of Iron Gate Dam, there is no suitable nesting habitat within the Action Area (defined as the 100-year floodplain) and construction activities would occur outside the inland range of the species (Iron Gate Dam is situated approximately 90 miles from the coast). Given the distance to suitable habitat from construction activities, there will be no impacts on the species from noise disturbance. Additionally, the nearest detection of the species was documented approximately 76 miles west of Iron Gate Dam (CDFW 2021). Contamination of prey base in the marine environment as a result of flushing sediment is likely to be consistent with exposing aquatic biota to an "average" water column chemical concentration, and exceedances of applicable marine bioaccumulation screening levels are not anticipated (CDM 2011).

Suspended sediment in the water column from the Proposed Action will neither affect the species' nesting habitat nor its critical habitat where it overlaps the Klamath River approximately 75 miles southwest of Iron Gate Dam. Contamination of the species' prey base as a result of flushing sediment is likely to be consistent with exposing marine biota to an "average" water column chemical concentration; with respect to bioaccumulation potential, there will be no exceedances of applicable marine bioaccumulation screening levels (CDM 2011).

B.17 Western Snowy Plover (*Charadrius alexandrinus nivosus*)

The Pacific coast population of the western snowy plover was listed as threatened in 1993 (58 FR 12864). Critical habitat was redesignated along the coasts of California, Oregon, and Washington in 2005 (70 FR 56970). The closest designated critical habitat is near Lake Talawa (21 miles north of the Klamath River estuary) and Big Lagoon (23 miles south of the Klamath River estuary). The closest proposed critical habitat is at Gold Bluffs Beach (7 miles) north of the Klamath River estuary, Stone Lagoon (21 miles south of the Klamath River estuary), and near Lake Talawa (21 miles north of the Klamath River estuary). This species nests in locations along Washington, Oregon, and California coasts (including Del Norte, Humboldt, and Mendocino counties). The nesting season extends from early March through late September. Western snowy plover nest on barren to sparsely vegetated dune-backed beaches, barrier beaches, salt-evaporation ponds, and infrequently on bluff-backed beaches. A small inland population, consisting of less than 1,000 birds in Oregon, is known to nest along the margin of alkaline lakes in southern Klamath County, Oregon, and the species is a rare fall migrant at the Klamath Wildlife Area. PacifiCorp did not locate any western snowy plovers during field surveys, and no suitable breeding habitat was observed in the Action Area (FERC 2007).

Suspended sediment in the water column from the Proposed Action is not expected to affect this species, nesting habitat, or critical habitat (7 miles from the Klamath River), because suspended sediment will be deposited offshore. Contamination of prey base as a result of flushing sediment is likely to be consistent with exposing marine biota to an "average" water column chemical concentration; with respect to bioaccumulation potential, there are no exceedances of applicable marine bioaccumulation screening levels (CDM 2011).

B.18 Yellow-Billed Cuckoo (*Coccyzus americanus*)

The western population of the yellow-billed cuckoo was federally listed as threatened in 2014 (79 FR 59991). Critical habitat was proposed in 2014 throughout the western United States in scattered areas between California and Colorado (79 FR 71373). The nearest proposed critical habitat is at the Eel River estuary (approximately 63 miles south of the Klamath River estuary) and areas adjacent to the Sacramento River south of Red Bluff, California.

The yellow-billed cuckoo typically nests in relatively large, contiguous patches of riparian habitat (USGS 2009). They have not been found nesting in isolated patches of less than 2 acres or narrow, linear riparian habitats that are less than 10 to 20 meters wide, although single birds have been detected in such isolated patches or linear habitats during migration or the early breeding season in mid-late June (Halterman et al.

2015). The species is not known to nest in Oregon, and suitable habitat has not been identified in the Oregon portion of the Action Area (USFWS 2018f). The nearest known nesting location in California is at the Sacramento River, although recent surveys found no evidence of breeding there (Halterman et al. 2015).

This species is not known to occur in the Action Area, and suitable habitat is limited.

B.19 Short-Tailed Albatross (*Phoebastris albatrus*)

The short-tailed albatross was listed as endangered in 2000 (65 FR 46643). Critical habitat has not been designated. During the non-breeding season, this species ranges along the continental shelf margins of the Pacific Rim from southern Japan to northern California. This species does not nest in California. This species primarily occupies the North Pacific Ocean, outside of the Action Area. Foraging habitat includes regions of upwelling and high productivity (e.g., Gulf of Alaska, along the Aleutian Chain, along the Bering Sea shelfbreak from the Alaska Peninsula out towards St. Matthew Island) (Suryan et al. 2007, Tickell 2000; both as cited in USFWS 2008c). Contamination of prey base as a result of flushing sediment is likely to be consistent with exposing marine biota to an “average” water column chemical concentration; with respect to bioaccumulation potential, there will be no exceedances of applicable marine bioaccumulation screening levels (CDM 2011).

B.20 Pacific marten (*Martes caurina*)

The coastal distinct population segment (DPS) of Pacific marten was federally listed as threatened in 2020 (85 FR 63806). No critical habitat has been designated for the species. The coastal marten generally inhabits older forest stands (e.g., late-successional, old-growth, large-conifer, mature, late-seral, structurally complex forests), or forests that have old-forest characteristics such as old and large trees, multiple canopy layers, snags, downed logs and other decay elements, dense understory development, and biologically complex structure and composition (85 FR 63807). Martens feed primarily on small mammals, but birds, insects, and fruits are seasonally important (Martin 1994). Martens are active year-round and appear to seasonally adjust their activity patterns to synchronize with those of their key prey species; thus, martens may be active at any time of the day (Zielinski et al. 1983).

Martens that may occur in or near the Action Area would likely belong to the northern coastal California population, which encompasses sections of the lower Klamath River. This portion of the Action Area provides old seral forest habitat and complex structures that are suitable for essential life history functions of the species. Martens present in that portion of the Action Area may cross the Klamath River, particularly during the fall when young martens typically disperse and when Klamath River flows would typically be lowest.

Martens occupying forested habitats adjacent to the downstream portion of the Action Area (i.e., the lower Klamath River) would not be impacted by potential effects on riverine habitats such as changes in suspended sediment concentrations because such effects would not impact marten habitat or prey. The Proposed Action would not result in changes in flows in the lower Klamath River that would affect dispersing martens or otherwise disrupt normal behavioral patterns of the species.

B.21 Canada Lynx (*Lynx canadensis*)

The Canada lynx was federally listed as threatened in 2000 (65 FR 16053). Final designation of critical habitat occurred in 2014 (79 FR 54781). The nearest critical habitat occurs in northern Washington, Idaho, and Montana; none occurs in Oregon or California. This species occurs in boreal forests across Canada and the northern United States from the Pacific to Atlantic coasts. It requires early and mid-succession boreal forests for hunting snowshoe hare, as well as late-successional forests for raising young (Ulev 2007). The boreal forests preferred by the Canada lynx are not present in the Action Area.

B.22 Sei Whale (*Balaenoptera borealis*)

The sei whale was listed as endangered in 1970 (35 FR 18319). No critical habitat has been designated. The species is found in the Pacific Ocean and has a wide range of subtropical, temperate, and subpolar waters around the world. It may migrate to higher latitudes during the summer and lower latitudes during the winter. It inhabits deep ocean waters far from the coastline, and forages on plankton, small schooling fish, and cephalopods. This species' preferred distribution is outside of the Action Area.

B.23 Blue Whale (*Balaenoptera musculus*)

The blue whale was listed as endangered in 1970 (35 FR 18319). No critical habitat has been designated. The North Pacific population extends throughout the Pacific Ocean and includes deep ocean waters off California. In general, species migrate towards the subtropics in the fall and sub-polar areas in the spring; however, evidence suggests some individuals reside in areas year-round. This species is generally found in deep ocean offshore waters, but it will also venture into coastal waters. Blue whales forage mainly on krill. Fish and copepods are unlikely to contribute significantly to their diet. This species' preferred distribution is outside of the Action Area.

B.24 Fin Whale (*Balaenoptera physalus*)

The fin whale was listed as endangered in 1970 (35 FR 18319). No critical habitat has been designated. This species inhabits the deep ocean waters of the Pacific Ocean and is distributed year-round in a wide range of longitudes and latitudes. However, it is primarily found in temperate to polar latitudes, and less commonly in the tropics. The specific migration patterns of the fin whales are complex, but migration to foraging areas in high-latitude marine environments has been documented. This species forages on krill, small schooling fish, and squid. This species' preferred distribution is outside of the Action Area.

B.25 North Pacific Right Whale (*Eubalaena japonica*)

The North Pacific right whale was listed as endangered in 1970 (35 FR 18319). Designated critical habitat is in the North Pacific Ocean (Bering Sea and Gulf of Alaska) where feeding is known or believed to occur (73 FR 19000). The species' preferred distribution is along coastal or shelf waters, and they appear to follow

prey that consists of zooplankton, including copepods, euphausiids, and cyprids (NMFS website). The species inhabits the Pacific Ocean, with recent sightings in sub-Arctic waters to the north, Bering Sea, central North Pacific, Hawaii, and south to Baja California. Migration is believed to occur from high-latitude feeding grounds in the summer to temperate waters during the winter (NMFS 2011). This species' preferred distribution is outside of the Action Area.

B.26 Humpback Whale (*Megaptera novaengliae*)

The humpback whale was listed as endangered in 1970 (35 FR 18319). No critical habitat has been designated. This species resides in oceans around the world. In the Pacific Ocean, the California/Oregon/Washington stock resides from southern British Columbia to southern California in the summer and fall, and winters in Central America and Mexico. It inhabits deep ocean waters, but it can also be observed near the coast. It forages on tiny crustaceans (mostly krill), plankton, and small fish. This species' preferred distribution is outside of the Action Area.

B.27 Sperm Whale (*Physeter macrocephalus*)

The sperm whale was listed as endangered in 1970 (35 FR 18319). No critical habitat has been designated. This species resides in oceans around the world. In the Pacific Ocean, sperm whales range between about 60°N and 60°S latitudes. Sperm whales are found year-round in California waters, but they reach peak abundance from April through mid-June, and from the end of August through mid-November. They have been seen in every season except winter (December to February) in Washington and Oregon. Because sperm whales spend most of their time in deep waters, their diet consists of many larger organisms that also occupy deep waters of the ocean. Their principal prey are large squid weighing between 3.5 ounces and 22 pounds, but they will also eat large demersal and mesopelagic sharks, skates, and fishes. This species' preferred distribution is outside of the Action Area.

Table B-2: Other Species Evaluated

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
Invertebrates					
<i>Bombus franklini</i> (Franklin's bumble bee)	Proposed Endangered	None	The species historically occupied portions of Douglas, Josephine, and Jackson Counties in southern Oregon as well as parts of Trinity and Siskiyou Counties in northern California (USFWS 2018d). Contemporary observations of the species are limited, and no confirmed observations have been reported since 2006 (USFWS 2018d). Therefore, the current distribution of the species is largely unknown.	Open (i.e., non-forested) meadows that support a diverse supply of flowering plants.	No detections of the species have been documented in areas that would be affected by the Proposed Action and impacts on potentially suitable habitats would be temporary and limited.
<i>Danaus plexippus</i> (Monarch butterfly)	Candidate	None	Migratory monarchs in the western North American population (occurring west of the Rockies) primarily overwinter along the coast of California and Baja California and move as far north as Washington, Idaho, and Oregon in the summer and fall.	Monarch habitat is broadly defined by the distribution of suitable species of milkweeds as these are the sole larval host plants for the species. Adults require a diversity of blooming nectar resources during breeding (spring through fall).	Conservation and minimization measures will be implemented to avoid impacts on milkweed and nectar plants during herbicide application and to direct construction activities away from any areas where biological monitors observe the species.

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
Amphibians					
<i>Rana boylei</i> (Foothill yellow- legged frog)	Under Review	None	Historically abundant west of the Cascade-Sierra mountain crest, from central Oregon to Baja California, has declined over much of its former range (Davidson 2004, Olson and Davis 2007). Known to inhabit lower reaches of the Klamath River and its tributaries. Numerous studies by the Yurok Tribe and others have observed foothill yellow-legged frogs in or near the Trinity River (Lind et al. 1996; Wheeler et al. 2015; Lind et al. 2016).	Primarily inhabits small tributary streams, but migrates to shallow, slow-moving areas of mainstem channels during the breeding season (Wheeler and Welsh 2008; Catenazzi and Kupferberg 2013).	It is expected that the high suspended sediment loads caused by the Proposed Action, particularly during the second peak event which is expected to occur in mid-June and may extend into early September depending on the water year, will adversely affect vulnerable life stages of foothill yellow-legged frog in the lower Klamath River. Therefore, the Proposed Action may affect, and is likely to adversely affect, the foothill yellow-legged frog.

Scientific name (common name)	Federal status	Critical Habitat	Distribution	Habitat associations	Rationale for Not Considering Further in Biological Assessment
Birds					
<i>Gymnogyps californianus</i> (California condor)	Endangered	Critical habitat has been designated for the species in parts of central and southern California (42 FR 47840). The nearest critical habitat unit (Tulare County Rangelands) is approximately 425 miles southeast of Iron Gate Dam.	Historically occurred along the Pacific Coast from British Columbia south to northern Baja California, Mexico (USFWS 1996). Currently there are more than 300 free-flying wild condors distributed among release sites in Arizona, California, and Mexico (Peregrine Fund 2019). However, the species is completely absent from the northern part of its historical range and a current proposal would release a non-essential experimental population of the condor at Redwood National Park in Humboldt County, California (USDOT and the Yurok Tribe 2019).	Nesting habitat found in caves and crevasses located on steep rock formations, cliff ledges, in the burned-out hollows of old-growth conifers (Koford 1953) or the nests of other species (USFWS 1996). Foraging habitat typically consists of open grasslands and oak savannas (Meretsky and Snyder 1992).	If condors are released at Redwood National Park, it is unlikely that individuals released in late 2021 or 2022 will occupy the Action Area when most activities are scheduled in 2022-2024. In the unlikely event a condor does disperse to the Action Area, the birds will be tracked by the Yurok Tribe and would be returned to the release site as a behavioral correction (USDOT 2019). In addition, there will be biological monitors onsite trained to identify this species and coordination with the Tribe, state and federal wildlife agencies will be immediately conducted to solicit measures to minimize and/or avoid adverse effects to condors including hazing, anti-perching, debris management, and avoiding entanglement/entrapment hazards.

B.28 Franklin's Bumble Bee (*Bombus franklini*)

B.28.1 Species Status

USFWS first identified the Franklin's bumble bee as a Category 2 Candidate species on January 6, 1989 (USFWS 1989) as well as in subsequent Candidate Notice of Reviews in 1991 and 1994 (USFWS 1991 and 1994). Category 2 was defined as: "Taxa for which information now in the possession of the Service indicates that proposing to list as endangered or threatened is possibly appropriate, but for which persuasive data on biological vulnerability and threat are not currently available to support proposed rules." Subsequently, on February 28, 1996, USFWS discontinued its designation of Category 2 species as candidates (61FR7596) and the Franklin's bumble bee is no longer classified as a Candidate species. The species was petitioned for listing by the Xerces Society on June 23, 2010 (Xerces Society & Thorp 2010). A Species Status Assessment was completed in 2018 by USFWS (USFWS 2018d) and the species was proposed for listing as endangered on August 13, 2019 (USFWS 2019c). No critical habitat was proposed.

A complete description of the status of the species can be found in the Species Status Assessment (USFWS 2018d) and the Proposed Rule (USFWS 2019c). *Bombus franklini* is thought to have the most limited distribution of all known North American bumble bee species. The range of the species is limited to Douglas, Josephine, and Jackson Counties in southern Oregon and Siskiyou and Trinity Counties in northern California. Between 1923 and 1992, there were 31 occurrences recorded in Oregon and seven recorded in California. Of the 38 records, 25 noted five or less bees, and only one 1968 record counted more than 12 bees at a single location, although there is some uncertainty regarding the survey efforts and methodologies during this time period (USFWS 2018d). During focused surveys from 1998 to 2006, *B. franklini* was observed at 11 sites, including seven sites where it had not been previously documented and two sites where many more bees were observed. The last detection was in 2006 approximately 10 miles southwest of Ashland, Oregon and 12 miles northwest of Iron Gate Dam.

The proposed rule indicates "the Franklin's bumble bee is a habitat generalist, and the present or threatened destruction, modification, or curtailment of habitat is not a threat to Franklin's bumble bee." The proposed rule indicates, "...based on the lack of observations of Franklin's bumble bee over the last 13 years it is possible that the species is extinct." The proposed rule identified the use of pesticides as a significant threat to the species.

Franklin's bumble bee nest sites include abandoned rodent burrows underground, on the ground, and in rock piles; the species has also been found nesting in a residential garage in Medford, Oregon. Flight season occurs from mid-May through September. Colonies can contain up to 400 workers. They are generalist foragers and gather nectar and pollen from a wide variety of flowering plants in open meadows and are found in a wide variety of sheltered and exposed habitat types in a broad elevational range.

B.28.2 Environmental Baseline of the Species in the Proposed Action Area

The vegetation and topography of the Action Area is described in Chapter 4 - *Environmental Baseline* of the BA. The project is located in Klamath County in Oregon and Siskiyou County in California. Also referred to as the Klamath Basin which is within the Klamath Bioregion (California) and the East and West Slope Cascades (Oregon) eco-regions, vegetation communities in these eco-regions include drier pine and fir forests in the mountain ranges of Siskiyou and Klamath Counties. Recognized for their biological diversity, the Klamath-Siskiyou mountain ranges contain a rich diversity of plant species, including 30 temperate conifer tree species. Land cover in the Klamath basin consists of a combination of upland tree habitat, aquatic habitat, mountain meadows and wetland habitats. Sagebrush and interior valley vegetation communities also exist in lower-elevation areas. The Klamath River canyon itself is a mosaic of mixed conifer forest communities and riparian habitats.

Terrestrial habitats surrounding the Hydroelectric Reach where construction activities for the Proposed Action would occur have experienced significant modification associated with the hydropower generation facilities in a steep river canyon setting. As previously stated, the Franklin's bumble bee is a habitat generalist that can utilize grasslands and forests as foraging and in-ground burrows and human structures for nesting; therefore, it is assumed the habitats present surrounding the Hydroelectric Reach are suitable for this species.

The closest detections of the Franklin's bumble bee are approximately 7.7 miles west of Iron Gate Dam near Hornbrook, California and 11 miles northwest of Iron Gate dam near Hilt, California in 1998. The last detection of the species was near Mt. Ashland in Jackson County, Oregon in 2006. Despite focused surveys by species experts from 1998 to 2006, and by the larger entomological community before 1998, no Franklin's bumble bees have been detected near the Hydroelectric Reach.

B.28.3 Effects of the Proposed Action

A full description of the proposed action can be found in Chapter 2 of this BA. Potential effects to Franklin's bumble bee could occur during demolition and deconstruction of the hydropower facilities, including the residential and work-related outbuildings, by crushing the species during its nesting period and from the loss of foraging habitats. Ground-based disturbance will occur when construction equipment removes and stockpiles materials and accesses the project site. Herbicides will be used to reduce the spread of non-native "weeds" along access roads and within the project site during the construction period. After demolition of the hydropower facilities, restoration of the reservoir footprint and major tributaries will include the use of herbicides to minimize the spread of non-native invasive vegetation species and allow for native species colonization by restoration actions.

The Renewal Corporation has filed management plans that implement the Proposed Action. These management plans include a variety of measures and BMPs developed to minimize the effects of the demolition of the dams and ancillary facilities and the restoration of the terrestrial and aquatic habitats. Collectively, these management plans will implement substantive actions that address the various state and federal environmental permit requirements and include measures to protect water and air quality and

terrestrial and aquatic fish, wildlife, and plant species. Of particular relevance to the Franklin's bumble bee are dust abatement, sediment and erosion, herbicide use and buffers, construction timing, and biological monitors on the construction site, which are discussed and described in detail in Appendix C and Appendix E of the BA. As the project permitting and planning progress with agency feedback, these BMPs and/or measures to minimize environmental effects will be collated and used by the onsite biological monitors to assure compliance and protection of a variety of vertebrate and invertebrate species.

A full description of herbicide use including products, formulation, and BMPs to minimize effects to listed species can be found in Appendix C of the BA. The BMPs identified in Appendix C of the BA are taken from BLM and USFWS decision documents (BLM 2010 & USFWS 2013b). Herbicides will be applied only to non-native invasive species in limited areas. Application methods will be by ground-based vehicles or by hand with special attention to environmental conditions to limit drift and runoff. Areas of native species, especially milkweed (*Asclepias* spp.), *Agastache urticifolia*, *Monardella villosa* and other genera such as, *Ceanothus*, *Eriogonum*, *Lupinus*, native *Trifolium*, and *Veratrum* will be identified during the application process and avoided to the extent practicable.

B.28.4 Conclusion

Although not listed, based on the status of the species and the avoidance measures identified in the proposed action, the Renewal Corporation concludes that Franklin's bumble bee is not likely to be adversely affected by the Proposed Action and will not be jeopardized. This conclusion is based on the lack of known presence of the species at or near the proposed construction activities, the limited suitable habitats that will be impacted, the temporal nature of project construction activities, and the minimization measures that will be implemented to protect listed species. The removal of the significant human footprint associated with the operating hydropower facility will greatly reduce the use of pesticides, providing a substantial benefit to the species. The extensive restoration and management activities, especially the conversion of 2,500 acres of reservoir footprint to grassland and riparian habitats, is likely to benefit the species in the future. In addition, 8,000 acres of PacifiCorp property, the Parcel B lands in California associated with the hydropower license, will be turned over to CDFW for management as they determine appropriate.

B.29 Monarch Butterfly (*Danaus plexippus*)

B.29.1 Species Status

A petition to list the monarch butterfly as threatened pursuant to the ESA was submitted to USFWS on August 26, 2014 (CBD et al. 2014). On December 31, 2014, USFWS issued a 90-day finding that the petition presented substantial scientific or commercial information indicating that the petitioned action may be warranted and initiated a review of the status of the subspecies to determine if the petitioned action was warranted (USFWS 2014). A Species Status Report on the monarch was published by USFWS in September 2020 (USFWS 2020a) and the 12-month finding on the species was published on December 17, 2020 (USFWS 2020b). USFWS's determination in the 12-month finding was as follows: "After a thorough review of the best available scientific and commercial information, we find that listing the monarch butterfly as an

endangered or threatened species is warranted but precluded by higher priority actions to amend the Lists of Endangered and Threatened Wildlife and Plants.” USFWS added the species to the list of candidate species and the agency will continue to evaluate the species as new information becomes available (USFWS 2020b). Candidate species are defined as, “plants and animals for which USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities.”

A thorough analysis of the habitat use of the monarch, status of the species, and threats affecting the monarch’s viability can be found in the petition to list the species (CBD et al. 2014), the 90 day and 12-month findings, and the Species Status Review (USFWS 2014, 2020b and 2020a). The review and analysis contained herein is based primarily on those documents.

The monarch is a species of butterfly globally distributed throughout 90 countries, islands, and island groups. These butterflies are well known for their long-distance migration in the North American populations. Descendants of these migratory monarch populations expanded from North America to other areas of the world where milkweed (their larval host plant) was already present or introduced.

The monarch is widely distributed across the United States, occurring in a variety of urban and rural habitat types especially those that have milkweed (*Asclepias* spp.), *Gomphocarpus* spp., and *Calotropis* spp. (closely related genera), and other flowering forbs that are foraged upon for nectar. Monarchs lay eggs on plants in the milkweed family (*Asclepiadaceae*) and larvae feed only on milkweeds, primarily those in the genus *Asclepias*, of which monarchs are known to use more than 30 species in the wild (de Roode 2015).

The monarch is grouped into 31 populations worldwide and one of the two North American populations occurs west of the Rockies. Migratory monarchs in the western population primarily overwinter in eucalyptus (*Eucalyptus* spp.), Monterey pine (*Pinus radiata*), Monterey cypress (*Cupressus macrocarpa*), and western sycamore (*Platanus racemosa*) groves along the coast of California and Baja California and move as far north as Washington, Idaho, and Oregon in the summer and fall.

The primary drivers affecting the health of the North American migratory populations are loss and degradation of habitat (from conversion of grasslands to agriculture, widespread use of herbicides, logging/thinning at overwintering sites in Mexico, senescence, incompatible management of overwintering sites in California, urban development, and drought), continued exposure to insecticides, disease and predation, and effects of climate change. Availability, spatial distribution, and quality of milkweed and nectar resources (breeding) and use of insecticides are most responsible for their decline. The availability of milkweed is essential to monarch reproduction and survival. Reductions in milkweed is cited as a key driver in monarch declines. A majority of the milkweed loss has occurred in agricultural lands, where intensive herbicide usage for weed control has resulted in widespread milkweed eradication.

During breeding and migration, adult monarch butterflies require a diversity of blooming nectar resources, which they feed on throughout their migration routes and breeding grounds (spring through fall). Monarchs also need milkweed embedded within this diverse nectaring habitat for both oviposition and larval feeding. The correct phenology, or timing, of both monarchs and nectar plants and milkweed is important for

monarch survival. The position of these resources on the landscape is important as well. In western North America, nectar and milkweed resources are often associated with riparian corridors, and milkweed may function as the principal nectar source for monarchs in more arid regions. Additionally, many monarchs use a variety of roosting trees along the fall migration route.

B.29.2 Environmental Baseline of the Species in the Proposed Action Area

The vegetation and topography of the Action Area is fully described in Chapter 4 - *Environmental Baseline*, of the BA. The project is located in Klamath County in Oregon and Siskiyou County in California. The Klamath Basin is within the Klamath Bioregion (California) and the East and West Slope Cascades (Oregon) eco-regions; vegetation communities in these eco-regions include drier pine and fir forests in the mountain ranges of Klamath and Siskiyou Counties. Recognized for their biological diversity, the Klamath-Siskiyou mountain ranges contain a rich diversity of plant species, including 30 temperate conifer tree species. Land cover in the basin consists of a combination of upland tree habitat, aquatic habitat, mountain meadows, and wetland habitats. Sagebrush and interior valley vegetation communities also exist in lower-elevation areas. The Klamath River canyon itself is a mosaic of mixed conifer forest communities and riparian habitats.

Terrestrial habitats surrounding the Hydroelectric Reach where construction activities for the Proposed Action would occur have experienced significant modification associated with the hydropower generation facilities in a steep river canyon setting. As previously stated, the monarch is a habitat specialist in the summer and fall months and focuses on milkweed and other closely related genera for foraging. It is assumed that habitat with the preferred host plants is present within terrestrial communities surrounding the Hydroelectric Reach in isolated patches potentially associated with landscape plantings at residential structures, open meadows, and forested areas.

In addition, there are at least four native species of milkweed found in the Klamath bioregion: showy milkweed (*A. speciosa*), narrowleaf milkweed (*A. fascicularis*), swamp milkweed (*A. incarnata*) and purple milkweed (*A. cordifolia*). *A. fascicularis* and *A. incarnata* were detected during a wetland delineation effort at Raymond Gulch at Copco No. 1 Reservoir and approximately 0.8 miles to the southeast of Raymond Gulch in a patch of wet meadow at the reservoir's edge. These sites are not within the construction footprint and will not be disturbed.

While no surveys for monarch have been conducted within the Action Area, the species likely can be found during summer and fall months breeding and/or migrating to overwintering and breeding sites on the coast of California. In 2017, USFWS tagged a monarch that hatched in Klamath Falls, Oregon which is located approximately 16 miles north-east of J.C. Boyle Dam and 39 miles north-east of Iron Gate Dam (USFWS 2018b). After emerging from pupation on September 3, 2017, the tagged individual was recorded 19 days later ovipositing in Santa Barbara, California, a movement of over 500 miles.

B.29.3 Effects of the Proposed Action

A full description of the Proposed Action can be found in Chapter 2 - Effects of the Proposed Action, of the BA. Potential effects to the monarch could occur during demolition and deconstruction of the hydropower

facilities, including the residential and work-related outbuildings, by crushing the species during its nesting period and from the loss of foraging habitats associated with landscaped nectar plants near residential buildings. Ground-based disturbance will occur when construction equipment removes and stockpiles materials and accesses construction areas. Herbicides will be used to reduce the spread of non-native “weeds” along access roads and within construction areas during the construction period. Prior to and after demolition of the hydropower facilities, and during restoration of the reservoir footprint and tributaries, the Proposed Action will include the targeted use of herbicides to minimize the spread of non-native invasive species and to allow for native species colonization by restoration actions.

A full description of herbicide use including products, formulation, and BMPs to minimize effects to listed species can be found in Appendix C of the BA. The BMPs identified in Appendix C of the BA are taken from BLM and USFWS decision documents (BLM 2010 and USFWS 2013b). Herbicides will be applied only to non-native invasive species in limited areas. Application methods will be by ground-based vehicles or by hand with special attention to environmental conditions to limit drift and runoff. Areas of native species and nectar sources, especially milkweed (*Asclepias* spp.), will be identified during the application process and avoided.

B.29.4 Conservation Measures

To protect monarchs, the Renewal Corporation will implement the following measures prior to and after demolition of the hydropower facilities and during restoration activities:

- Herbicides will be carefully applied in limited areas and will avoid areas of milkweed and other suitable nectar plants that will be identified prior to application.
- On-site biological monitors will report any observations of monarchs in the monthly reports and will, to the extent practicable, direct construction activities away for observed sightings.
- Site restoration of over 2,500 acres of reservoir footprint and several important tributaries will include significant native plantings that will include milkweed and other suitable nectar plants.
- The project will remove over 40 structures and associated human use patterns, including herbicide use to control weeds, that likely limit monarch habitation.

B.29.5 Conclusion

Based on the status of the species, the limited scope of direct project impacts on monarch habitats, and the avoidance measures identified in the Proposed Action, the Renewal Corporation concludes that the monarch is unlikely to be adversely affected by the Proposed Action. This conclusion is based on the limited suitable habitats that will be impacted, the temporal nature of project activities, and the minimization measures that will be implemented to protect listed species. It should be noted that the extensive restoration activities and management, especially the conversion of 2,500 acres of reservoir footprint to grassland and riparian habitats, is likely to significantly benefit the species in the future. The Renewal Corporation and the Yurok Tribe are currently collecting and developing sources for native seed and plants that will be used during the restoration. To the extent available and practicable, native plants used will include the appropriate locally adapted milkweed species and suitable nectar plant species, which will benefit the monarch.

B.30 Foothill Yellow-Legged Frog

B.30.1 Species Status

The foothill yellow-legged frog is currently under review for listing under the federal Endangered Species Act throughout its range (i.e., California and Oregon). On July 1, 2015, the USFWS issued a 90-day finding on the status of the foothill yellow-legged frog and determined that a federal listing for the species may be warranted (80 FR 37568-37579).

The foothill yellow-legged frog was historically abundant west of the Cascade-Sierra mountain crest, from central Oregon to Baja California, including the Klamath Basin, but the species has declined over much of its historical range (Davidson 2004, Olson and Davis 2007). Foothill yellow-legged frogs are known to inhabit lower reaches of the Klamath River and its tributaries. Numerous studies have observed foothill yellow-legged frogs in or near the Trinity River (Lind et al. 1996; Wheeler et al. 2015; Lind et al. 2016).

The foothill yellow-legged frog inhabits small tributary streams for much of the year, but migrates to shallow, slow-moving areas of mainstem channels to lek, mate, and lay eggs (Wheeler and Welsh 2008; Catenazzi and Kupferberg 2013). Studies in northern California and southern Oregon have observed breeding activity between March and June, with oviposition peaking in April and May (Lind et al. 1996; Olson and Davis 2007). Generally, in coastal, rain-fed systems, breeding occurs between May to mid-June, while in the Sierra Nevada and Klamath-Siskiyou snowmelt-fed systems, breeding occurs between late April to early July (CDFW 2018).

The initiation and duration of mating and oviposition are correlated with stream flow velocities; breeding activity is typically timed to occur after peak flows have subsided (Lind et al. 1996; Wheeler and Welsh 2008). Water temperature is also an important factor influencing the onset of oviposition (Kupferberg 1996; Wheeler et al. 2015). Females select sites with lower than ambient flow velocities for oviposition, because egg masses are susceptible to detachment under high flows such as rain events or dam releases (Lind et al. 2016). Suitable flow velocities in breeding habitats typically do not exceed 0.21 meters per second (Lind et al. 1996). The distance from shore that eggs are deposited is variable and dependent on water depth; shallow depths of less than 0.5 meters are required (Kupferberg 1996). Shade from riparian vegetation is also required, but this species rarely breeds in areas with greater than 90 percent canopy coverage because the lack of sunlight limits growth of algae, an important food source for tadpoles (Hayes et al. 2016). Annual variation in flow and temperature regimes means the timing of oviposition may change from year to year at a site, and there may be considerable variation within a watershed. Some evidence suggests that foothill yellow-legged frogs tend to return to the same breeding locations year after year (Olson and Davis 2007; Wheeler and Welsh 2008; Lind et al. 2016).

Egg masses, which may contain hundreds to thousands of eggs, are deposited on the leeward side of unconsolidated cobbles, boulders, or other large substrates in suitably slow-moving areas along main channels (Kupferberg 1996). Fine substrates are not suitable for oviposition, suggesting that excessive silt accumulation on substrates may prevent egg mass attachment (Bondi et al. 2013). Females have been

observed brushing fines away from substrates using their hind legs to prepare surfaces for oviposition (Rombough and Hayes 2005; Wheeler et al. 2003).

Tadpoles emerge from eggs within one to three weeks and begin to feed on epiphytic diatoms and algae (Borisenko and Hayes 1999). Tadpoles typically metamorphose into adults within 3-4 months (Wheeler et al. 2015; Railsback et al. 2015). Outside of the breeding season, post-metamorphic foothill yellow-legged frogs typically travel to shaded tributaries and remain in areas within or adjacent to flowing water outside of the breeding season (Kupferberg 1996; Bourque 2008). Post-metamorphic frogs are generalist predators that primarily eat insects and other small invertebrates (Hayes et al. 2016). Key predators include garter snakes (*Thamnophis* spp.), wading birds, bullfrogs, and carnivorous fish (Borisenko and Hayes 1999). Overwintering is believed to occur within and along streams and rivers, but little is known about overwintering timing or preferred microhabitats (Olson and Davis 2007).

Over the last half century, pressures such as altered flow regimes in regulated streams and rivers, habitat loss, invasive species, and pollution from agriculture, mining, and logging have contributed to the disappearance of the foothill yellow-legged frog significant portions of its historical range (Davidson 2004; Kupferberg et al. 2012).

Dams and loss of natural hydrology and sedimentation processes is a significant threat to the species, and populations that live in streams below dams have experienced a notable decline due mainly to the disruption of flowing waters (Lind et al. 1996; Bondi et al. 2013; Wheeler et al. 2015). Above dams, the creation of reservoirs inundates and eliminates critical lotic breeding habitat, without which foothill yellow-legged frog populations cannot persist (Kupferberg et al. 2012). Downstream of dams, the disruption of natural hydrological and thermal conditions can also impact foothill yellow-legged frogs. In natural systems, breeding and tadpole development are timed to avoid peak flows. In regulated rivers, high flow velocities associated with aseasonal releases of water can disrupt cues for breeding activity, scour breeding habitat, detach egg masses from substrates, and injure or kill tadpoles (Kupferberg et al. 2011; Lind et al. 1996). Deviation from preferred temperature conditions is also associated with increased tadpole mortality (Catenazzi and Kupferberg 2013). Changes in channel geomorphology due to damming may also allow vegetation to encroach, which reduces sunlight and the growth of algal food sources (Lind et al. 1996). The lentic habitat of reservoirs can also serve as breeding grounds for non-native American bullfrogs (*Lithobates catesbeianus*), which compete with and predate upon foothill yellow-legged frogs (Kupferberg 1996; Fuller et al. 2011).

Managed releases of cold, hypolimnetic water from reservoirs to aid salmonid species can result in persistently depressed summer water temperatures, which contributes to delayed breeding activity and metamorphosis, inhibited tadpole growth, and decreased metamorph size and body condition (Wheeler et al. 2015). Drops or fluctuations in water level may result in exposure and desiccation of egg masses and tadpoles (Railsback et al. 2015).

Excess sediment, which may result from runoff, may disrupt food sources, such as algae (tadpoles) or macroinvertebrates (post-metamorphic frogs).

B.30.2 Environmental Baseline of the Species in the Proposed Action Area

Foothill yellow-legged frogs are not likely to occur in the Project reservoirs because this species does not inhabit lentic environments. At and around the current site of the PacifiCorp dams, historical records indicate that several creeks and localities (Jenny Creek, Cottonwood Creek, Shoat Springs, Bogus Creek, mainstem Klamath near the current J.C. Boyle Bypass) sustained foothill yellow-legged frog populations prior to the installation of the dams (Borisenko and Hayes 1999; PacifiCorp 2004). More recent surveys of the Action Area, documented by PacifiCorp (2004) and Borisenko and Hayes (1999), have observed poor water quality and a lack of suitable foothill yellow-legged frog habitat.

PacifiCorp conducted frog visual encounter surveys at ten sites in the Hydroelectric Reach and downstream of Iron Gate Dam, including areas along the mainstem Klamath River and in stream segments directly adjacent to the mainstem channel (PacifiCorp 2004a). These surveys failed to detect foothill yellow-legged frogs in any of the surveyed areas. Surveys by Borisenko and Hayes (1999) also failed to detect foothill yellow-legged frogs at known historical habitats in Oregon, including stream segments along the East Fork Cottonwood Creek (upstream of the Action Area), Jenny Creek (upstream of the Action Area), and the mainstem Klamath River along the J.C. Boyle power canal (within the Action Area). Although surveys have not detected foothill yellow-legged frogs in these areas, it is possible that they occur.

Foothill yellow-legged frogs are known to inhabit lower reaches of the Klamath River and its tributaries, over a hundred miles downriver of the areas surveyed by PacifiCorp. Numerous studies have observed foothill yellow-legged frogs in or near the Trinity River (Lind et al. 1996; Wheeler et al. 2015; Lind et al. 2016). In June 2009, USFWS and Yurok Tribe staff conducted foothill yellow-legged frog surveys around the confluence of the Klamath River and Blue Creek and extending about 2.0 river miles downriver along the mainstem Klamath River. Surveyors observed 13 adults, 6 juveniles, and 4 egg masses; all 4 egg masses were detached from the substrate and free-floating. Within Blue Creek, 2 adults and 15 egg masses were observed (Bettaso, pers. comm., November 2017).

Similar surveys under the same two lead surveyors were conducted along several miles of the lower Klamath River in June 2011. Surveyors observed several adults, juveniles, and egg masses, ranging from freshly deposited to hatching. During surveys of several gravel bars downstream of the Trinity River confluence, surveyors noted that several egg masses had been stranded (attached to vegetation or other structure above the water and subject to desiccation) or were expected to strand prior to hatch-out (Bettaso, pers. comm., November 2017).

In summer 2017, biologists from Green Diamond Resource Company conducted habitat assessments on tributaries in the Coast Range (Kluber, pers. comm., October 2017). They documented foothill yellow-legged frogs at 22 locations along tributaries of the lower Klamath River, from Terwer Creek to Roach Creek. The habitat assessments occurred in July and August, after foothill yellow-legged frog breeding season, and no egg masses were seen. Adults, juveniles, and tadpoles were detected, indicating that reproductive populations were present. Tributary habitat assessment surveys did not always extend down to the confluence and did not include surveys of the Klamath River itself, but they do suggest tributaries of the

coast range can provide refuge and source populations for foothill yellow-legged frogs in the lower Klamath River.

B.30.3 Effects of the Proposed Action

Short-term Effects

Due to the absence of suitable habitats and the lack of foothill yellow-legged frog observations in recent surveys in the Action Area surrounding the dams and reservoirs, reservoir drawdown and dam removal are not likely to affect foothill yellow-legged frogs in the hydroelectric reach. However, reservoir drawdown and dam removal may have short- and long-term effects on foothill yellow-legged frog habitat in the downstream portion of the Action Area within the mainstem lower Klamath River. Short-term effects associated with drawdown include changes in sediment distribution and local hydrology. Reservoir drawdown rates will be within the natural variation for winter seasonal flows and are not expected to alter local hydrology in the lower Klamath River where foothill yellow-legged frogs occur. Therefore, short-term effects center around the potential effects of suspended sediments and fine sedimentation, as described below. Long-term effects include changes in habitat availability due to the restoration of natural flow regime.

Suspended Sediments

As sediment is released from reservoirs during drawdown, high concentrations of suspended sediment will enter the waters downstream of the dams. Based on the suspended sediment modeling conducted to analyze background conditions and the Proposed Action (Appendix I), suspended sediment concentrations just downstream of Iron Gate Dam are expected to be very high for approximately 8 weeks in the drawdown year, with the potential for peak concentrations exceeding 5,000 mg/L for several days to up to 2 weeks depending on the water year. A second peak SSC event is expected in mid-June, and elevated suspended sediment concentrations and low dissolved oxygen may extend into early September depending on the water year.

Peak suspended sediment concentrations would be lower as the distance from Iron Gate Dam increases. At the Seiad Valley, Orleans, and Klamath stream gauges farther downriver, peak suspended sediment concentrations will likely be elevated above background from mid-June through August, which coincides with the time when foothill yellow-legged frog egg masses and/or tadpoles may be present in the lower reaches of the Klamath River. Therefore, suspended sediment concentrations may adversely affect foothill yellow-legged frogs, such as through inhibition of light penetration and photosynthesis for periphytic algae, an important food source for tadpoles, and “suffocating” egg masses.

Sediment Deposition

Based on the sediment transport analysis, the river reaches between the reservoirs are not expected to experience significant erosion/deposition of sediment, and the majority of the cobble, gravel, and sand exported from the reservoir sediments are expected to deposit close to Iron Gate Dam. The amount of sediment deposition will decrease with distance from the dam. Cobble and gravel, which support foothill

yellow-legged frog oviposition habitat, will continue to predominate in the bed material in downstream reaches. In the initial years following dam removal, a higher-than-average proportion of sand will be present in the bed material downstream of the dams, but the natural bed composition would be restored over the next 2 to 10 years. Cobble, gravel, and sand are not expected to reach the estuary.

Significant deposits of fine sediments downstream of the Shasta River confluence are not anticipated; however, under drier conditions, a small volume of fines may be deposited in vegetated areas or slack waters along the river channel and in the estuary (USBR 2011a). These areas may currently serve as foothill yellow-legged frog oviposition habitats. Females are capable of scraping fines off of substrate surfaces to improve egg mass attachment (Wheeler et al. 2003). Therefore, fine sediment deposition is not anticipated to substantially disrupt attachment of egg masses. In addition, as any sediment deposition will occur prior to oviposition in most cases, excess silt accumulation on top of egg masses is not expected to widely occur. Accumulation of sediment on egg masses is common under natural conditions and may actually serve to conceal eggs from predators (California Herps 2019).

Sediment deposition in the mainstem river channel may adversely affect macroinvertebrate food sources for adult frogs. The river bed composition will be dynamic following dam removal, with flows directing sediment (particularly sand) to depositional areas. Macroinvertebrates in depositional areas may be smothered, as was observed following the removal of two large dams on the Elwha River in Washington (Rubin et al. 2017). However, invertebrates will likely persist in the river channel outside of depositional areas (Rubin et al. 2017). In addition, adult foothill yellow-legged frogs primarily feed on terrestrial invertebrates (Hayes et al. 2016), which would not be affected by sediment deposition in the river.

Recovery of affected macroinvertebrate populations in the mainstem Klamath River in the reaches downstream of the dams may take months to several years, depending on various factors such as extent of deposition, taxa present in the area, proximity to healthy source populations, and water quality (Foley et al. 2017, Hansen and Hayes 2012). In some cases, macroinvertebrate biomass recovery has been reported as quickly as one to three months in lotic systems if post-disturbance waters have low turbidity (Yount and Niemi 1990). Benthic macroinvertebrate assemblages were similar upstream and downstream of former small dams within one year after dam removal in studies by Tullos et al. (2014) and Stanley et al. (2002). Other studies have observed longer recovery times; an analysis of eight small dam removals in Michigan and Wisconsin observed that recovery of species richness and taxonomic similarity took three to seven years to recover on average (Hansen and Hayes 2012). Full stabilization of benthic communities and recovery of population densities may take decades (Foley et al. 2017, Hansen and Hayes 2012).

Within the new river channel that forms in the locations of the current reservoirs, benthic habitats are expected to transition into habitats more characteristic of lotic systems. Lotic macroinvertebrates may colonize quickly because tributaries and river sections between reservoirs are expected to provide source populations, which is a key factor in determining colonization rate (Tonkin et al. 2014, Yount and Niemi 1990). Natural and augmented depressions in the former reservoir bottom may provide seasonal wetland habitats favored by some macroinvertebrates (Batzer and Wissinger 1996).

Long-term Effects

The replacement of lentic reservoir habitat with free-flowing river habitat is anticipated to result in increased availability of suitable foothill yellow-legged frog breeding habitat in the hydroelectric reach of the Action Area. The restoration of natural thermal and hydrological regimes will eliminate several major negative stressors on foothill yellow-legged frog populations downstream of the dams, such as seasonal peak flows and artificially depressed water temperatures. The reduction in habitat for reservoir-dwelling predators such as bullfrogs or sport fish is also likely to benefit foothill yellow-legged frogs. CDFW recommends exploring dam removal where appropriate to benefit this species (Thomson et al. 2016).

Initially, the availability of foothill yellow-legged frog breeding habitat in the restored river reaches may be limited until cobble bars develop and vegetative cover becomes established. It will also take time for foothill yellow-legged frogs to migrate to the newly formed habitats, as they have not been found to be present currently in the reservoirs or surrounding tributaries.

B.30.4 Conclusion

Foothill yellow-legged frogs occur in the lower Klamath River. Breeding activities may begin in late March for some individuals but breeding and oviposition most commonly occur later in the spring during April or May. The Proposed Action will cause high concentrations of suspended sediments in the mainstem Klamath just downstream of the dams, with peak suspended sediment concentrations occurring in January and February of the dam removal year, and a second peak occurring from mid-June through August coinciding with the time when foothill yellow-legged frog egg masses and/or tadpoles may be present in the lower Klamath River. Suspended sediment concentrations will depend on the water year and are difficult to estimate in the lower reaches. Therefore, the Renewal Corporation concludes that suspended sediment concentrations have the potential to affect foothill yellow-legged frogs, particularly tadpoles, if they are present in the lower Klamath River in the drawdown year.

Course sediment consisting of cobble, gravel, and sand, is expected to be deposited on the river bed between the Iron Gate Dam and Cottonwood Creek. Fine sediments are not expected to deposit in significant quantities downstream of the Shasta River confluence. Therefore, the effects of sediment deposition, including effects on egg attachment and loss of macroinvertebrate food base, are not anticipated to affect areas where foothill yellow-legged frogs are present in the lower Klamath River.

Long-term effects of the Proposed Action will benefit the species through restoration of natural thermal and hydrological regimes that will eliminate several major negative stressors on foothill yellow-legged frog populations in the lower Klamath River, such as seasonal peak flows and artificially depressed water temperatures. In addition, the replacement of reservoir habitat with free-flowing river habitat is anticipated to result in increased availability of foothill yellow-legged frog breeding habitat in the hydroelectric reach.

Although not listed, the Proposed Action is likely to adversely affect the foothill yellow-legged frog during the drawdown year due to suspended sediment concentrations when vulnerable life stages are present in the

lower Klamath River. In the long term, the Proposed Action is expected to benefit the foothill yellow-legged frog.

Although foothill yellow-legged frogs are not anticipated to occur in the Hydroelectric Reach, if the species is encountered during general wildlife surveys, the Renewal Corporation will notify CDFW, ODFW, and USFWS, as appropriate, consistent with the Terrestrial and Wildlife Management Plan.

B.31 California Condor (*Gymnogyps californianus*)

B.31.1 Species Status

The California condor (*Gymnogyps californianus*) was first recognized as an endangered species in 1967 in accordance with the Endangered Species Preservation Act of 1966 (USFWS 1967) and the species was subsequently listed as Endangered under the ESA of 1973 (16 U.S.C. §1531 et seq). Critical habitat was designated in 1977 (USFWS 1977) and a 5-Year review of the status of the species was completed in 2013 (USFWS 2013a).

In 2019, an Environmental Assessment prepared pursuant to NEPA (42 U.S.C. § 4321 et seq) for the *Northern California Condor Restoration Program* was released (USDOW and Yurok Tribe 2019) and the species was proposed to be designated as an Experimental Non-essential population in Oregon, and specific portions of Northern California and Nevada (USFWS 2019b). The plan to release the Experimental Non-essential population of condors is still a proposal and condors have not yet been released. Experimental populations are authorized pursuant to Section 10(j) of the ESA. Any experimental population designated for a listed species (in this case, the California condor) that is determined not to be essential to the survival of that species but occurs within the National Park System or the National Wildlife Refuge System will be treated for purposes of Section 7 as a species proposed to be listed under the ESA as a threatened species.

The California condor was first protected under California law in 1901 and protected from take in California's Fish and Game Code (section 1179.5) in 1953. The condor was listed under the California ESA as endangered on June 27, 1971 and is fully protected pursuant to California Fish and Game Code Section 3511. In September of 2018, the State of California passed legislation that allows CDFW to consider the content of any final rules under Section 10(j) of the Federal ESA for the California condor. This recently enacted legislation (AB 2640) allows the Director of CDFW to evaluate the final rule and exempt take associated with the rule if the Director finds the final rule would further the conservation of the species.

This status review of the condor for the Proposed Action draws from the Recovery Plan (USFWS 1996), 5-Year Status Review (USFWS 2013a), the proposed rule designating an experimental non-essential population of condors in Northern California (USFWS 2019b), and other reports and literature as the most relevant and recent science. A complete description of the status of the species can be found in the 5-year Review (USFWS 2013a).

The California condor is the only remaining member of its genus in the family Cathartidae and is one of the rarest bird species in the world. California condors are scavengers that feed primarily on large mammalian

carcasses including elk, deer, and marine pinnipeds and cetaceans. At the time of the arrival of early explorers, California condors occurred in the western U.S. from British Columbia, Canada, to Baja California, Mexico, and inland to the Cascade and Sierra Nevada mountain ranges, with occasional observations farther east (Koford 1953). By about 1950, California condors were confined in southern California to six counties north of Los Angeles (Koford 1953). The decline during the early 1900s was likely the result shooting, collecting specimens, and later from secondary poisoning from DDT and lead (USFWS 2013a).

California condors nest in caves and crevasses located on steep rock formations, cliff ledges, in the burned out hollows of old-growth conifers including coast redwood (*Sequoia sempervirens*) and giant sequoia trees (*Sequoiadendron giganteum*) (Koford 1953), or the nests of other species (USFWS 1996). California condors predominately forage in open terrain of foothill grassland and oak savanna habitats, and repeatedly use roosting sites on ridgelines, rocky outcrops, steep canyons, or in tall trees or snags near foraging grounds. California condors have relatively heavy wing-loading (mass per wing area) and have a difficult time becoming and remaining airborne over flat terrain. Over such terrain, condors are almost exclusively dependent on the uplift provided by thermal cells. In favorable weather it is common for birds to cover great distances over the course of a day. Immatures and other unpaired condors are especially mobile, with one recorded flight in a single day by an immature male of 141 miles (225 km) (USFWS 1996).

A captive breeding program began in 1982 using eggs and chicks removed from the wild and a single captured adult condor, leaving an estimated 22 individuals in the wild (USFWS 2013a, Peregrine Fund 2019). In the winter of 1984 to 1985, a population crash claimed six condors leaving only a single breeding pair in the wild. During 1986 and early 1987, all nine remaining adult and juvenile wild birds were captured to start a captive breeding program in order to ensure their safety and preserve the species' genetic diversity. Along with the 13 wild eggs and four chicks from wild nests captured previously, a captive breeding stock consisting of 27 birds plus a condor removed from the wild as a fledgling in 1967, became the nucleus of the captive breeding program.

In 1992 the first eight captive-reared birds were released at Hopper Mountain National Wildlife Refuge in southern California. The reintroduction of birds continued at several additional sites including the Vermillion and Hurricane Cliffs of Utah and Arizona; Big Sur, San Simeon, and Pinnacles National Park in central and coastal California; and northern Baja, California and Mexico. At least 1,000 condor chicks have hatched in captivity and in the wild. Currently, there are more than 500 individuals in the world and more than 300 free-flying wild birds distributed among the five release sites (Peregrine Fund 2019). However, the condor is completely absent from the northern part of their historical range; a current proposal would release condors at Redwood National Park in Humboldt County, California (USDOL and Yurok Tribe 2019).

B.31.2 Environmental Baseline of the Species in the Proposed Action Area

Land use, topography, and vegetation in the Action Area is described in Chapter 4 of the BA. The Action Area falls within the historical range of the species (Koford 1953, USFWS 2013a). D'Elia et al. (2015) developed an ecological niche model for the condor, and northwest California (including the Action Area) was identified as ideal habitat for reintroduction. The Hydroelectric Reach is set in a steep-sided canyon with abundant cliffs, escarpments, and perch sites. Adjacent to and surrounding the Hydroelectric Reach are open

grasslands, coniferous forest, and sage brush-steppe habitats. The Iron Gate area has been identified as important deer winter range and supports a modest elk population; livestock grazing, and dry farm agriculture is an important land-use in the surrounding watershed (BLM 2000). Overall, the Action Area appears to be an ideal setting for condors should they become reestablished in the northern part of the range.

In 2019, USFWS proposed to release condors in northern California's Redwood National Park in Humboldt County (USDOL and Yurok Tribe 2019). The proposed experimental population analysis has identified a primary boundary where the species is expected to roost, nest, and forage in the years after release and which extends out 100 to 300 kilometers (62-186 miles) from the release point (USDOL and Yurok Tribe 2019). It is approximately 100 air miles to Iron Gate dam and 116 miles to J.C. Boyle Dam from the proposed release site; therefore, the Action Area is within the range of the post-release condor. Critical Habitat is not designated in the Action Area (USFWS 1977); however, the Action Area does contain many of the topographic, vegetative and land use features in the surrounding watershed that California condors could use.

B.31.3 Effects of the Proposed Action

The most intensive construction activities under the Proposed Action will occur in 2023 when J.C. Boyle, Copco Nos. 1 and 2, and Iron Gate dams and ancillary structures will be demolished in an approximately 10-month period (January to October). Restoration activities will occur primarily in mid-2023 through 2024, with some less intensive follow-up in 2025 and 2026. All activities will be focused on the facilities which lie, for the most part, at river level in a steep-sided canyon.

A decision on the release date of condors at the Redwood Park site has not been determined as of the preparation of this BA in March 2021. The release dates are anticipated to occur soon after a Finding of No Significant Impact pursuant to NEPA is issued (USFWS 2019b). A facility would need to be constructed, and birds to be released (up to 6 per year) would be held at the release/management facility for a period of acclimatization and evaluation for several weeks to months (USFWS 2019b). Based on information from previous condor releases, a period of time (likely 2 to 6 months), would occur before condors are released into the wild (USFWS 2019b). Upon release, the release site would be baited with carrion to acclimate the condors to the area and create a center of activity for the birds. Post release, condors are expected to remain close to the release site for a significant period of time before they venture far distances (J. Brandt pers. comm. 2021). One release study in Arizona shows that some condors will disperse and follow major river corridors but that long distance flights were rare (USFWS 2002a).

Various reports suggest that condors are curious and will investigate human habitations and activities and potentially harm themselves and/or disrupt their normal wild behavior patterns. There is evidence that condors are not disturbed by human activity in the same way as eagles or other bird species. The behavioral concerns related to human activity are that condors may become habituated to humans (e.g., seeking out human-inhabited areas for food sources, developing a lack of flight response, and approaching humans); there currently is no evidence that condors would be disturbed by construction activities such that they would abandon the area for nesting, foraging, and roosting (J. Brandt pers. comm. 2021).

Various factors would likely minimize the potential for released condors to interact with project demolition and restorations activities. As the Hydroelectric Reach where construction activities would occur is 100 to 116 miles to the east of the proposed release site, it is not expected that condors would move this distance in the first year after release (J. Brandt pers. comm. 2021). As the population of condors in Northern California is established and starts to expand, which could easily take a decade or more, predicting where the birds will disperse will be difficult. The Klamath River corridor is one possible area for expansion. Although that the Klamath River could be conducive to condor movement, a large amount of habitat exists between the release site and Hydroelectric Reach. The suitable habitat between the release site and the Hydroelectric Reach provides ample, easily-accessible resources to condors and thus, the likelihood of condors occupying the Hydroelectric Reach before these other areas is small (C.D. Pogue pers. comm. 2021).

Even assuming the first release occurs in 2021, condors would be habituated to the release site and are unlikely to move to the Hydroelectric Reach during the Proposed Action's construction activities. The most disruptive of the Proposed Action construction activities (demolition) are scheduled to be completed in late 2023 and the subsequent restoration activities would involve fewer workers, less activity, and less noise; therefore, it is unlikely that condors would be present at the Hydroelectric Reach during these activities. In addition, the majority of condors slated for release would be fitted with radio and GPS transmitters, and if the birds venture as far as the Hydroelectric Reach, it is likely they will be recaptured and returned to the release site as a behavioral modification tool to allow a successful reintroduction (J. Brandt pers. comm. 2021). In the long-term, the Proposed Action would have a beneficial effect on the released condors from restoration of potential foraging grounds, as explained in the section below.

B.31.4 Conservation Measures

The infrastructure demolition associated with the Proposed Action will reduce the risk of collision and electrocution, both of which are primary threats to condors, with the removal of 115,189 ft. of transmission, distribution, and communication line, along with the removal of up to 129 wood and metal poles. All of these actions would significantly improve habitat conditions should condors disperse to the area in the future. In addition, the restoration of over 2,500 acres of reservoir footprint to grassland, riparian and woodland areas, will be available for ungulate use and provide some benefit to condors as they seek foraging opportunities.

There is a significant fish and wildlife monitoring and management program associated with the Proposed Action. The monitoring and management activities, both during and post demolition, will require a number of professional fish and wildlife biologists to be present onsite at various times and places throughout the life of the Proposed Action. Based on specific resources concerns, the monitoring will be regularly reported and in the case of some species direct communications with the fish and wildlife agencies (CDFW, USFWS, ODFW, and NMFS) will be established as part of the overall plan. California condors will be a species that fish and wildlife professionals and site workers will be trained to identify and report immediately in the unlikely even they are detected in the Action Area.

B.31.5 Conclusion

USFWS and their partner the Yurok Tribe are currently finalizing the NEPA analysis and USFWS will publish a Final Rule regarding the experimental release of California condors at the Redwood Park site. Assuming the decision is to release the condor as an experimental population, the partners in the proposed release will need some time to construct the release facilities, transport condors, and habituate the birds to the site prior to release. Even assuming that condors released in late 2021 or 2022 will occupy the Hydroelectric Reach during the period of time when most construction activities are scheduled in 2022-2024. In the unlikely event a condor does disperse to the Hydroelectric Reach, the birds will be tracked by the Yurok Tribe and would be returned to the release site as a behavioral correction (USDOL and Yurok Tribe 2019). In addition, there will be biological monitors onsite trained to identify this species and coordination with the Tribe, state, and federal wildlife agencies will be immediately conducted to solicit measures to minimize and/or avoid adverse effects to condors including hazing, anti-perching, debris management, and avoiding entanglement/entrapment hazards.