Appendix C Profiles of Additional Listed Species in the LOHCP Area

C.1 California red-legged frog (*Rana draytonii*)

C.1.1 Conservation Status and Planning

The California red-legged frog (*Rana draytonii*) is a federally listed endangered species (USFW 1996) and designated as a Species of Special Concern by the California Department of Fish and Wildlife (CDFW 2016). The US Fish and Wildlife Service (USFWS) completed a recovery plan for the endangered frog in 2002 (USFWS 2002). The recovery plan identifies the Estero Bay area near Morro Bay as a core area because it may serve as a source population, and it is important for maintaining connectivity (USFWS 2002).

In 2010, the USFWS designated final critical habitat for the species, which includes 1,636,609 acres in 27 California counties (USFWS 2010b). This includes an 116,515-acre area (SLO #3) that encompasses the foothills north of San Luis Obispo; this unit extends to the eastern portion of Morro Bay just north of the LOHCP Area.

Within the area of designated critical habitat, the primary constituent elements of California red-legged frog are (USFWS 2010b):

1. **Aquatic Breeding Habitat:** natural or manmade still or slow-moving water bodies that become inundated with water during winter months and hold water for a minimum of 20 weeks;
2. **Aquatic Non-Breeding Habitat:** water bodies as described above that hold water for a duration long enough to complete its aquatic life cycle and provide shelter, foraging, predator avoidance, and aquatic dispersal of juvenile and adult;
3. **Upland Habitat:** upland areas surrounding aquatic breeding and non-breeding habitat and riparian habitat up to a distance of 1 mile; and
4. **Dispersal Habitat:** Accessible upland or riparian habitat occupied or previously occupied that is located within 1 mile of each other.

C.1.2 Distribution

The California red-legged frog is endemic to California and Baja California, where the species' known elevation range is between sea level and approximately 5,200 feet (USFWS 2002). In California, California red-legged frog occurs along the Coast Range Mountains from Mendocino County to the California/Mexico border, in parts of the Cascade Range, and along the western Sierra Nevada foothills between Shasta and Fresno counties (Shaffer et al. 2004). It is believed to have been extirpated from approximately 70% of its range, including the Transverse and Peninsular ranges in the southern portion of California (USFWS 2002).

The central coast from San Francisco to Santa Barbara County supports the greatest number of drainages occupied by California red-legged frog (CNDDB 2016). In San Luis Obispo County, California red-legged frogs are found in streams, stock ponds, dune ponds, and springs on the coastal plain and western slopes of the Santa Lucia Range from San Carpoforo Creek in the north to the Santa Maria River in the south. The species has been observed in 30 streams (USFWS 2002) in San Luis Obispo County,

including Pico, Little Pico, Toro, San Simeon, Santa Rosa, Chorro, and Arroyo Grande creeks (Jennings et al. 1992, USFWS 1996).

There are no known occurrences of California red-legged frog within the LOHCP Area (CNDDB 2016); however, there are several records in surrounding areas including one approximately 0.50-mile north of the LOHCP Plan Area in Morro Bay State Park, just east of South Bay Boulevard. The second nearest occurrence is located on private property approximately 0.55-mile east of the LOHCP Plan Area associated with Warden Lake.

C.1.3 Habitat

The California red-legged frog inhabits ponds (including livestock ponds), marshes, springs, streams, and reservoirs as well as adjacent upland habitats (Hayes and Jennings 1988). The species preferentially occurs in deep pools with dense stands of overhanging willows (*Salix* spp.) and an intermixed fringe of cattails (*Typha* spp.); however, all life stages (eggs, larvae, juveniles, and adults) have been found in ephemeral drainages, and in ponds that do not have vegetation (Rathburn et al. 1993, USFWS 2002). Adults utilize dense, shrubby, or emergent riparian vegetation closely associated with deep (>2.25 feet), still or slow-moving water (Hayes and Jennings 1988). Red-legged frogs require cold-water pond habitats (including stream pools) with emergent and submergent vegetation (Storer 1925).

Aquatic habitat lacking non-native predators including fish and bull frogs (*Lithobates catesbeianus*) and featuring aquatic and riparian vegetation provides the best, long-term habitat for California red-legged frog. The species appears to be closely tied to small drainage areas and their intermittent water flow as opposed to large drainage areas and their perennial water flow; this may reflect restricted access by aquatic predators (Hayes and Jennings 1988).

California red-legged frog also occurs in uplands adjacent to breeding habitat, and along intermittent drainages connecting wetlands, which they may use for seasonal migration and dispersal. Juveniles may also disperse locally between July and September (USFWS 2000). Adult migration away from breeding habitat occurs primarily at night during wet periods within the non-breeding season (e.g., November to April; Fellers and Kleeman 2007). Movements ranging from 0.25 to over 2 miles are known to occur without regard to topography or vegetation type, including through a diversity of intact and degraded habitats such as agricultural lands (Bulger et al. 2003, Fellars and Kleeman 2007). They can be found living more than 1.8 miles from breeding habitat (USFWS 2000).

C.1.4 Biology

C.1.4.1 Morphology

The California red-legged frog is a 2 to 5.25-inch long, reddish brown to gray frog that features many poorly defined dark specks and blotches, which are absent on the back and top of its head. It features a light stripe on its jaw, folds on its back and sides, and only partially webbed toes; its underside is yellow with red on the lower abdomen and hind legs. Females are larger than males, which have enlarged forearms and swollen thumbs (USFW 1996).

C.1.4.2 Daily Activity

Although the species may hibernate in inland areas (Storer 1925), California red-legged frogs along the coast are rarely inactive (Jennings et al. 1992). They may aestivate in small-mammal burrows and moist leaf litter, where they have been found up to 100 feet from water in adjacent dense riparian vegetation for up to 77 days (Rathburn et al. 1993). Adults are largely nocturnal, whereas juveniles can be active either diurnally or nocturnally.

C.1.4.3 Diet

California red-legged frogs have a variable diet that includes primarily invertebrates, although larger frogs can consume Pacific tree frogs and California mice, which can constitute over half of the prey mass. Juveniles feed during both day and night, but adults and sub-adults feed primarily at night (Hayes and Tennant 1985).

C.1.4.4 Reproduction

California red-legged frogs breed from November through April, with earlier breeding records occurring in southern localities (Storer 1925). During a one-to-three-week period typically between late December and early April, females lay their loose, oval, floating clusters of about 2,000-5,000 eggs in still water (Storer 1925). Egg masses are generally attached to vertical emergent vegetation near the surface of the water (Hayes and Miyamoto 1984). Eggs hatch in 6-14 days, and metamorphosis occurs 3.5 to 7 months after hatching (Storer 1925, Jennings and Hayes 1990).

Developing eggs and embryos of this taxon are unable to survive salinities of >4.5 0/00 (Hayes and Jennings 1988). Larvae require cold water (<65 °F) to develop properly (Jennings 1988); and likely experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis (Jennings et al. 1992). Two years after metamorphosis, males reach sexual maturity, while females require three years to attain sexual maturity (Jennings and Hayes 1985).

C.1.4.5 Survivorship

Predation by introduced fishes (Jennings 1988, Moyle et al. 1986, Hayes and Jennings 1986), bullfrogs (Jennings and Hayes 1985, Hayes and Jennings 1986), and crayfish, as well as disease, and parasites (Lefcort and Blaustein 1995) all have been known to affect California red-legged frogs. The species generally inhabits areas with dense vegetation, which limits use entry by other predators, such as birds and raccoons (*Procyon lotor*). Survival rates for California red-legged frogs from hatching to metamorphosis range from one to less than five percent for frogs co-occurring with bullfrogs and 30 to 40 percent for those without bullfrogs (USFWS 2000). Adults live 8 to 10 years (USFWS 2000, Jennings et al. 1992).

C.1.5 Threats

California red-legged frogs are threatened by habitat loss and degradation due to over-collecting, pesticides, herbicides, reservoir construction, stream channels development, urbanization, overgrazing, and drought (USFWS 2002). They are also impacted by competition with and predation by introduced species, particular bullfrogs and fish (Moyle 1976, USFWS 2002); like other California ranids, they evolved under conditions of limited fish predation since California possesses only a small number of

native fish species that prey on vertebrates (Moyle 1976). California red-legged frogs can also be infected by diseases including chytridiomycosis—a disease caused by chytrid fungi, which causes deformations and mortality (USFWS 2002).

C.2 California black rail (*Laterallus jamaicensis coturniculus*)

C.2.1 Conservation Status

California black rail (*Laterallus jamaicensis coturniculus*: Rallidae) is a fully protected species that is also listed as threatened by the State of California (CDFW 2016).

C.2.2 Distribution

Historically, the breeding range of California black rail extended from Tomales Bay north of the San Francisco Bay area (including Sacramento/San Joaquin Delta) south along California's coast to northern Baja California; the species also occurred inland in San Bernardino and Riverside counties, the Salton Sea, and along lower Colorado River north of Yuma in Arizona and California (Zeiner et al. 1990). Presently, most individuals are found in the northern reaches of the San Francisco Bay estuary (including San Pablo and Suisun bays) and associated rivers; additional small, fragmented subpopulations persist at Tomales Bay, Bolinas Lagoon, Morro Bay, and in southeastern California and western Arizona (Evens et al. 1991).

Adults are largely non-migratory, although adults and juveniles have been observed as far as 20 miles from breeding habitat (Eddleman et al. 1994). The California population apparently is resident, though individuals are occasional observed away from wetlands in late summer and autumn, suggesting some post-breeding movement (Zeiner et al. 1990).

Within the LOHCP Plan Area, the California black rail has been recorded in three areas (CNDDB 2016):

- Sweet Springs Nature Preserve;
- the salt marsh habitat located between Los Osos Creek and the Elfin Forest approximately 0.25-mile west of South Bay Boulevard; and
- Los Osos Creek approximately 0.25-mile southeast of South Bay Boulevard.

The species likely inhabits additional suitable habitat along the edge of Morro Bay and Los Osos Creek.

C.2.3 Habitat

The California black rail primarily inhabits the upper zones of saline emergent wetlands and brackish fresh emergent wetlands. It is most commonly observed in tidal emergent wetlands in the immediate vicinity of tidal sloughs, which feature pickleweed (*Salicornia* spp.), bulrushes (*Bolboschoenus* spp. and *Schoenoplectus* spp.) and cattails *(Typha* spp.), though California black rail may take cover in upper wetlands and adjoining uplands during extremely high tides (Zeiner et al. 1990).

C.2.4 Biology

The California black rail is a small, blackish rail with a small, black bill and a chestnut-colored nape. Largely diurnal, the species primarily vocalizes at dusk and to a lesser extent at night. It forages on the ground primarily for insects and secondarily on crustaceans and aquatic plant seeds (Ehrlich et. al. 1988). Their primary predators are herons and domestic cats (Zeiner et al. 1990).

The California black rail breeds between March and June. Nests are deep, loose cups located in or along the edge of marshes, usually on a mat of grass concealed by dense vegetation. Clutch sizes in this single-brooded species average six and range between three and eight (Zeiner et al. 1990). Both sexes incubate the eggs for approximately 16-20 days; young are precocial (Ehrlich et. al. 1988).

C.2.5 Threats

California black rail are endangered primarily as a result of loss of coastal wetlands and inland freshwater marshes (Ehrlich et. al 1988), as well as incompatible water-management practices for agriculture and salt production in coastal. Additional threats may include marsh subsidence due to groundwater removal, diking of salt marshes, water level fluctuation, wildfires, grazing, and cultivation, and the spread of non-native predators including domestic cats (Eddleman et al. 1994).

C.3 California seablite (*Suaeda californica*)

C.3.1 Conservation Status

California seablite (*Suaeda californica*: Chenopodiaceae) is a federally listed endangered species (USFWS 1994) and is ranked as most threatened and endangered according to the California Rare Plant Ranking (List 1B.1; CNPS 2016). The species was addressed in the Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California (USFWS 2013b).

C.3.2 Distribution

California seablite is endemic to central coastal California where it historically occurred in two disjunct locations: San Francisco Bay and Morro Bay and nearby Cayucos. It was extirpated from the San Francisco Bay, though was reintroduced into four areas between 1999 and 2008 (USFWS 2013b). Today, the species is known from three reintroduction locations along San Francisco Bay, four estuarine beach locations near Cayucos, and seven areas on the Morro Bay shoreline, including two areas within the LOHCP Area:

1. Along the peninsula of Baywood Park, and
2. And along the bay between the sand spit to the west, and Sweet Springs Preserve, to the east (CNDDB 2016).

The species also occurs along the sand spit, immediately west and north of the LOHCP Area (CNDDB 2016).

C.3.3 Habitat

California seablite is found in a narrow zone in the upper edge of tidal marsh at the ecotone between salt marsh and the adjacent coastal sage scrub (USFWS 2010a). There it occurs within coarse, well-drained marsh substrates on sandy wave-built berms or ridges along marsh banks, and on estuarine beaches (USFWS 2013b).

In the Los Osos Area, California seablite co-occurs with salt grass (*Distichlis spicata*), saltbush (*Atriplex* spp.) pickleweed (*Salicornia virginica*), alkali-heath (*Frankenia salina*), fleshy jaumea (*Jaumea carnosa*), and the federally endangered salt marsh bird's beak (*Cordylanthus maritimus* ssp. *maritimus*; USFWS 2010a). In estuarine beach habitat near Cayucos, California seablite occurs with many of the same species as well as sea rocket (*Cakile maritima*), beach-bur (*Ambrosia chamissonis*), beach heliotrope (*Heliotropium curassavicum*), and sand verbena (*Abronia* spp.; USFWS 2010a).

C.3.4 Biology

California seablite is a succulent-leaved perennial plant in the goosefoot family (Chenopodiaceae). The species blooms July through October (CNPS 2016). Though the plant spreads laterally, reproduction appears to be entirely sexual; plants do not reproduce vegetatively. Isolated plants have been observed to produce viable seed, suggesting the species is self-compatible to at least a certain degree (USFWS 2010a). The hard-coated seeds are enclosed in fleshy calyces that are remain attached after dehiscence and may promote dispersal (USFWS 2010a).

California seablite seedlings have been observed in drift-lines and vegetation gaps along the high-tide line in Morro Bay. Plants reach reproductive maturity in as little as one year (USFWS 2010a). Though the life span is unknown, 10-year-old plants were observed in stabilized habitat within Morro Bay State Park (USFWS 2010a).

C.3.5 Threats

The Morro Bay occurrences of California seablite are threatened by shoreline development, storm erosion, recreational activity on tidal flats, and nonnative plants including ice plant (*Carpobrotus edulis*; USFWS 2010a, 2013). California seablite is also threatened by sea-level rise, especially where populations abut development or other conditions that might preclude landward migration of wetland habitat (USFWS 2013b).

C.4 Salt marsh bird's-beak (*Chloropyron maritimum* ssp. *maritimum*)

C.4.1 Conservation Status

Salt marsh bird's-beak (*Chloropyron maritimum* ssp. *maritimum*) is listed as endangered under both the California and federal endangered species acts (USFWS 1978, CDFW 2016); the taxon's name at the time of the species' listing was *Cordylanthus maritimus* ssp. *maritimus*. Salt marsh bird's beak is ranked as moderately threated (List 1B.2) according to the California Rare Plant Ranking system (CNPS 2016). A Recovery Plan was prepared for salt marsh bird's beak in 1984 (USFWS 1984); the species' recovery is also addressed in the Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California (USFWS 2013b).

C.4.2 Distribution

Historically, salt marsh bird's-beak was widespread in coastal salt marshes from Morro Bay in San Luis Obispo County to San Diego County and northern Baja California, Mexico. Currently, the species is known from seven coastal salt marshes between San Diego County and San Luis Obispo County (USFWS 2009), including the southern shore of Morro Bay in the LOHCP Area. There it has been recorded in three, disjunct patches, two of which are west of Cuesta-by-the-Sea, and the other that is just east of it (CNDDB 2016).

The Consortium of California Herbaria database features five specimens of salt marsh bird's-beak that were collected in the Morro Bay region between 1973 and 2000; of these, three were collected from within the LOHCP Area (CCH 2014):

- two from the Sweet Springs Nature Preserve, and
- one in Cuesta-by-the-Sea northwest of the intersection of Pecho Valley Road and Binscarth Road along the margin of Morro Bay.

The other two specimens were collected outside of the LOHCP Area along the margin of Morro Bay: one on the east side of the Morro Bay Sand Spit and the other west of the terminus of Howard Street (CCH 2014).

C.4.3 Habitat

Salt marsh bird's-beak grows in the upper portions of coastal and brackish marshes, in the region generally above most tidal flows and subject only to high tides; the clay and silt soils in these areas are drier than lower-elevation areas, particularly during the summer drought. Its distribution appears to be tied to areas that receive inflows of fresh water, which may influence germination (USFWS 2009). Co-occurring species include pickleweed, salt grass, seaheath (*Frankenia* spp.), saltbush, and California seablite (USFWS 2009).

C.4.4 Biology

Salt marsh bird's-beak is an annual with densely hairy grey-green leaves that are tinged purple. The branched plants grow up 16 inches tall and feature spiked inflorescences. The flowers, which are bee-pollinated, have yellow-tipped upper petals and purple lower petals. The species flowers between May and October; each capsule (fruit) produces 15-40 seeds (Baldwin et al. 2012).

As with other members of the broom rape family (Orobanchaceae), salt marsh bird's beak is a hemiparasite; it features green tissue and can produce sugars through photosynthesis yet obtains at least some water and dissolved nutrients from the roots of their host plants. In laboratory trials, salt marsh bird's beak parasitized saltgrass, pickleweed, fleshy jaumea, and other species; these as well as other species may serve as hosts (USFWS 2009).

This short-lived annual germinates in March and April and flowers between May and October; some plants have been observed to senesce as early as July (USFWS 2009). Flowers are self-compatible and pollinated by bees. Seeds are buoyant and can float for up to 50 days, perhaps enabling long-distance dispersal (USFWS 2009).

C.4.5 Threats

Salt marsh bird's-beak has been endangered primarily due to habitat loss, resulting from development and agricultural conversion, which contributed to the loss of over 90 percent of coastal salt marshes and tidal freshwater marsh (Callaway et al. 2007). In remaining habitat, salt marsh bird's-beak is threatened by channelization and water diversions as well as other factors that affect hydrology, including freshwater inflow, such as climate change. Notably, sea-level rise can alter tidal flows in ways that impact coastal marshes supporting salt marsh bird's-beak and its host plants (USFWS 2009). The species may also be impacted by factors that convert or degrade upland habitat supporting native pollinators including bees. Several non-native competitors are displacing salt marsh bird's beak from their habitat, including sea lavender and several exotic grasses. Finally, salt marsh bird's-beak is also vulnerable to impacts resulting from loss of genetic variation, which is very low (USFWS 2009).

C.5 Marsh sandwort (*Arenaria paludicola*)

C.5.1 Conservation Status

Marsh sandwort (*Arenaria paludicola*) is listed as endangered under both the California and federal endangered species acts (USWS 1993, CDFW 2016,); it is ranked as seriously threatened (List 1B.1) according to the California Rare Plant Ranking system (CNPS 2016). The USFWS finalized a recovery plan for the species in 1998 (USFWS 1998b).

C.5.2 Distribution

Marsh sandwort has been documented along the Pacific coast from Washington to southern California (CCH 2007 and CASH 2007); however, it is believed to have been extirpated from Washington and there are no known collections from Oregon (CASH 2007, OSUH 2007, Oregon Plant Atlas 2007).

Though historically known from numerous locations throughout coastal California, at the time of listing in 1993, marsh sandwort was known to be extant in only one area: Black Lake Canyon in southwestern San Luis Obispo County, where it has since become extirpated. In 1998, marsh sandwort was rediscovered at Osos Flaco Lake in southern San Luis Obispo County; this is the only known wild population for this species (USFWS 2014).

Within the LOHCP Area, marsh sandwort occurs in a single location, where it was planted into the northeast marshy portion of the within Sweet Springs Nature Preserve (USFWS 1998b; CNDDB 2016).

C.5.3 Habitat

A coastal species, marsh sandwort historically inhabited marshes and other perennially mesic areas including streams and creeks (USFWS 2008). It can grow in saturated acidic bog soils and soils that are sandy with a high organic content (USFWS 2014).

C.5.4 Biology

Marsh sandwort is a perennial herb in the pink family (Caryophyllaceae). Between May and August, it produces small, solitary, white flowers on long stalks that arise from the leaf axils. Fruits, which are capsules, contain 15-20 seeds (USFWS 1998b).

C.5.5 Threats

Marsh sandwort is threatened by loss of coastal wetland habitat, as well habitat degradation due to altered hydrologic conditions, sedimentation, and competition from exotic plants. Additionally, its small populations, including those resulting from reintroductions, may face reduced fitness due to pollinator deficiencies, excessive inbreeding, and loss of genetic diversity.

C.6 Steelhead (*Oncorhynchus mykiss irideus*)

C.6.1 Conservation Status

The South-Central California Coast Distinct Population Segment (DPS) of steelhead (steelhead), or coastal rainbow trout (*Oncorhynchus mykiss irideus*: Salmonidae) is a federally-threatened species (USFWS 2005) that is also designated as a Species of Special Concern by the California Department of Fish and Wildlife (CDFW 2016). The National Marine Fisheries Service (NMFS) published a recovery plan for this species in December 2013 (NMFS 2013). In 1996, the California Department of Fish and Game (Wildlife) developed a Steelhead Restoration and Management Plan for California (CDFW 1996).

In addition, NMFS has designed critical habitat for steelhead (NMFS 2005); this includes a total of 1,240 stream miles and three square miles of estuarine habitat. The Estero Bay Hydrologic Unit, which contains critical habitat within the Los Osos Hydrologic Subarea, is one of five hydrologic units identified for the South Central California Coast Steelhead DPS. The extent of the Los Osos Hydrologic Subarea is described in the Final Rule as being: Outlet(s) = Los Osos Creek (Lat. 35.3379, Long. –120.8273) upstream to endpoint(s) in: Los Osos Creek (35.2718, –120.7627; NMFS 2005), approximately 4 miles southeast of the LOHCP Area.

The primary constituent elements of critical habitat for steelhead are those sites and habitat components that support one or more life stages, including:

- **Freshwater spawning sites** with water quantity and quality conditions and substrate supporting spawning, incubation, and larval development;
- **Freshwater rearing sites** with: (i) Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; (ii) Water quality and forage supporting juvenile development; and (iii) Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
- **Freshwater migration corridors** free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

- **Estuarine areas** free of obstruction and excessive predation with: (i) Water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; (ii) Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and (iii) Juvenile and adult forage including aquatic invertebrates and fishes, supporting growth and maturation.

C.6.2 Distribution

Steelhead, the anadromous form of the species *Oncorhynchus mykiss*, which also includes inland rainbow trout, historically occupied streams along the west coast of North America. The South-Central California Coast DPS extends from the Pajaro River at the border of Santa Cruz and Monterey counties, south to Arroyo Grande Creek in southern San Luis Obispo County. Streams further north and south support steelhead within the Central California Coast DPS and the Southern California Coast DPS, respectively.

Within the LOHCP Area, steelhead historically occurred in Los Osos Creek, which flows on the eastern perimeter of the Plan Area. In the recovery plan, Los Osos Creek has been identified as a Core 2 population; such populations and Core 1 populations are the focus of the recovery plan (NMFS 2013). Steelhead may be present in reaches of Los Osos Creek along the eastern perimeter of the LOHCP Area.

C.6.3 Habitat

Steelhead inhabit perennial coastal streams with clear, cool to cold, fast flowing water with high dissolved oxygen content and abundant gravels and riffles. Streams must contain spawning gravels of certain size and free of sediment, and cool, clean, and well-oxygenated water to allow egg incubation and development (NMFS 2013). Steelhead prefer habitat with relatively good water quality that has low suspended sediment and contamination loads, and minimal pollution levels (Leidy 2000). They require sufficient flows and habitat characteristics for spawning, rearing, and migration, such as shallow riffles for spawning and deep pools with well-developed cover for rearing (Leidy 2000).

C.6.4 Biology

C.6.4.1 Taxonomy

Steelhead are the anadromous (ocean going) form of rainbow trout. In California, steelhead is classified as the coastal subspecies, *Oncorhynchus mykiss irideus* (Behnke 1992). Steelhead populations have been divided into Evolutionarily Significant Units and Distinct Population Segments. The ESA defines a "species" to include any distinct population segment of any species of vertebrate fish or wildlife. For Pacific salmon, NOAA Fisheries Service considers an evolutionarily significant unit, or "ESU," a "species" under the ESA. For Pacific steelhead, NOAA has delineated distinct population segments (DPSs) for consideration as "species" under the ESA (NMFS 2011). Within the LOHCP Plan Area is the South-Central California Coast Steelhead DPS.

C.6.4.2 Morphology

Besides having a larger size at spawning, steelhead are nearly indistinguishable from the resident rainbow trout that also live in the same streams in which they spawn (Moyle 1976). They are usually

silver with black spots on the back; they have an adipose fin, dorsal fin, and a slightly forked tail and a pink to red lateral band (Moyle 2002). They also have pinkish colored cheeks, an iridescent blue to nearly brown back, and silver, white, or yellowish sides and belly. Adults that have returned from the ocean can reach approximately 23 inches in length (Leidy 2000). Freshwater juveniles or smolts range between 5-10 inches in length (Moyle 2002).

C.6.4.3 Diet

Juvenile steelhead feed on aquatic insects and their larvae, snails, amphipods, opossum shrimp, and small fish (Moyle 1976). Adults may also feed on newly emergent fry (Leidy 2000). Steelhead usually do not eat when migrating upstream and therefore lose body weight (Pauley and Bortz 1986). In the ocean, steelhead are drift feeders (Leidy 2000).

C.6.4.4 Reproduction

Following the first substantial rainfall in fall and winter, steelhead migrate to freshwater habitat where they spawn between December and April (Leidy 2000). Steelhead spawn in beds constructed by the female over a gravel and cobble substrate, where females lay eggs that are then fertilized by the males. Eggs incubate for approximately 3 to 4 weeks, and then hatched fry rear within the gravel interstices for an additional 2 to 3 weeks. Emergent fry rear at the stream margins near overhanging vegetation. Juveniles (smolts), after rearing for 1 to 3 years within freshwater and post-spawning adults migrate out to the ocean from March to July, depending on stream flows. Steelhead will migrate upstream after 1-4 growing seasons at sea (Burgner et al. 1992). After spawning, steelhead may return to the ocean and spawn the following year (Leidy 2000).

C.6.5 Threats

Steelhead are threatened by a variety of factors that have altered their habitat and affected populations directly; these include barriers to migration, water diversions, flow fluctuations, sub-optimal water temperatures for incubation and juvenile rearing, sedimentation of spawning habitat, and low summer flows for emigration (Leidy 2000). Land development, dams, and degradation of estuaries have also decreased steelhead juvenile rearing areas.

In San Luis Obispo County, streams and riparian corridors have been modified to increase conveyance for flood control, minimize bank erosion, and increase areas available for development and agricultural uses. These activities often change in the natural channel geometry (i.e., loss of complexity, meanders are lost) in ways that can reduce the ability of the habitat to support steelhead. Large woody debris (tree trunks, large limbs) is considered important for steelhead and other anadromous fish because it provides overhead cover, creates calm or lower velocity waters for resting, and creates greater habitat complexity. Large woody debris is typically removed from streams because it can create flooding hazards, blocks flow through culverts or damage culverts and bridges, and increases bank erosion.

Natural and man-made barriers in streams can prevent adult steelhead from reaching suitable spawning habitats causing the fish to breed in sub-optimal habitats where survival of the young is unlikely or creating traps where predators have easier access to concentrations of fish. Barriers can be caused by drop structures in streams or flood control channels, under–sized or poorly designed culverts and bridges, and under-grounding of streams.

Water quality and stream flows can also be affected by urbanization and cultivation; these factors may limit steelhead in Los Osos Creek (NMFS 2013).

C.7 White-tailed kite (*Elanus leucurus*)

C.7.1 Conservation Status

The white-tailed kite (*Elanus leucurus*: Accipitridae) has been designated a fully protected species by the California Department of Fish and Wildlife (CDFW 2016).

C.7.2 Distribution

The white-tailed kite is found year-round in California from the coast to the eastern edge of the Central Valley and the western edge of the Mojave Desert. White-tailed kites are resident through most of their breeding range in California, though may disperse in response to changes in prey abundance (Dunk and Cooper 1994). Globally, the species occurs in portions of Washington and Oregon, as well as Central America and South America.

There are no recorded occurrences of the white-tailed kite within the LOHCP Area (CNDDB 2016); the two nearest occurrences are located approximately 4.8 and 5.1 miles east of the LOHCP Area. However, a colony of white-tailed kites has been observed in the LOHCP Area near Eto Creek, north of Nipomo and east of South Bay Boulevard. The birds are winter resident, with occasional summer presence (J. Chesnut, pers. comm.). The Plan Area features suitable nesting and foraging habitat.

C.7.3 Habitat

White-tailed kite inhabits herbaceous and open stages of most lowland habitats with variable growth of trees, which they use for cover, and dense population of voles (*Microtis* spp.), which are their preferred prey (Waian and Stendell 1970). The species are rarely found away from agricultural areas and are often found in association with riparian areas.

C.7.4 Diet

The white-tailed kite primarily feeds during the day on voles and other small, diurnal mammals, though occasionally eats birds, insects, reptiles, and amphibians. It forages in grasslands, meadows, farmlands, emergent wetlands, and other habitats by soaring, gliding, and hovering within 100 ft. of the ground in search of prey.

C.7.5 Reproduction

The white-tailed kite breeds from February to October, with a peak from May to August. Nests are built near the top of a dense oak, willow, or other trees near open foraging areas; nests are constructed from loosely piled sticks and twigs that are lined with grass, straw, or small roots. Nest site availability can be limiting where prey availability is not (Dunk and Cooper 1994). The average clutch of this monogamous species is 4-5 eggs, with a range of 3-6. White-tailed kites roost communally in the non-breeding seasons (Waian and Stendell 1970).

C.7.6 Threats

White-tailed kites are threatened by conversion of natural and agricultural lands to urban uses, which reduces foraging and nesting habitat. Additionally, declines in the species have also been attributed to interspecific competition for nest sites, human disturbance at nests, and farming techniques that reduce prey populations (Dunk 1995). Other threats may include the robbing of nests by jays, crows, yellow-billed magpies, raccoons, and opossums and the predation by great horned owls.

C.8 Golden eagle (*Aquila chrysaetos*)

C.8.1 Conservation Status

Golden eagle (*Aquila chrysaetos*: Accipitridae) has been designated a fully protected species by the California Department of Fish and Wildlife (CDFW 2016). Golden eagle is also afforded protection by the federal Bald and Golden Eagle Protection Act.

C.8.2 Distribution

The golden eagle occurs year-round in all areas of California except the Sacramento and San Joaquin valleys, the Los Angeles Basin, the Mojave and Colorado desert regions, where it is found only during the winter, and in the coastal Klamath Mountains, where it does not occur (Zeiner et al. 1990). The known elevational range of this species extends from near sea level to approximately 11,500 feet (Grinnell and Miller 1944). Within California, golden eagles are mostly resident, but may move south during the winter, and north following the breeding season. Globally, the species has a holarctic distribution, and occurs as far south as North Africa, Arabia, and the Himalayas in the Old World, and as far south as Mexico in North America.

Within the LOHCP Area, suitable nesting habitat for golden eagle is present on the perimeter of the Plan Area; however, there are no records in this area. The nearest record of occurrence is approximately 10.2 miles northeast of the LOHCP along Eagle Creek south of the city of Atascadero (CNDDB 2016).

C.8.3 Habitat

Within California, golden eagles are most often associated with sage-juniper flats, deserts, grasslands, savannahs, and early successional stages of shrub habitats and forests on rolling hills (Zeiner et al. 1990). They are often found in areas with cliffs with overhanging ledges or near large trees, which they use for cover (Zeiner et al. 1990). Golden eagles are typically not found in heavily forested areas or on the immediate coast and are rarely detected in urban areas (Grinnell and Miller 1944, Garrett and Dunn 1981).

C.8.4 Diet

Golden eagles primarily prey upon rabbits, hares, and rodents but will periodically eat other mammals, as well as birds, reptiles, and carrion (Zeiner et. al, 1990). They forage during the day by soaring above open habitat, making low, quartering flights; golden eagles also occasionally search for pretty from a perch (Carnie 1954).

C.8.5 Reproduction

During their breeding season, which occurs between January through August, with peak activity between March and July (Beebe 1974), golden eagles nest on platform nests located on cliffs, large trees, or other tall landscape features, such as power transmission line towers, within otherwise open areas. Breeding pairs often show high site fidelity and may reuse nests from previous years (Kochert et al. 2002). Clutches usually consist of two eggs that are laid in early February to mid-March and require approximately six weeks of incubation (Beebe 1974).

C.8.6 Threats

Golden eagles are primarily threatened by habitat loss due to urban and agricultural land conversion. Pesticide and lead poisoning, as well as electrocution on powerlines, are also significant causes of mortality (DeLong 2004), while collisions with wind-turbine blades may be of concern in areas where such power generating structures are present (Hunt et al. 1997). Land management practices that affect prey abundance can also have effects on golden eagle populations. For example, conversion of shrublands to grassland may reduce rabbit abundance, which can have important effects of golden eagle demography (Knick and Dyer 1997).