Appendix A

Covered Species Screening

In connection with the San Luis Obispo Flood Control and Water Conservation District's (District) preparation of a habitat conservation plan (HCP) to support an incidental take permit (ITP) application covering the Southern California Central Coast (SCCC) distinct population segment (DPS) of steelhead, California red-legged frog, and southwest pond turtle (SWPT) (collectively, Covered Species), the District considered whether District activities associated with the Lopez Water Project may have the potential to take other species listed or proposed for listing under the federal Endangered Species Act (ESA). The purpose of this appendix is to summarize basic ecological information about species considered for inclusion in the HCP, which were ultimately not added as Covered Species, along with a brief rationale for why the species was not included as a Covered Species under the HCP.

Tidewater Goby

The tidewater goby (*Eucyclogobius newberryi)* was listed as a federally endangered species in 1994 because of extirpation from nearly 50% of the coastal lagoons within its historic range largely as a result of destruction of estuarine and coastal wetland habitat, although upstream water diversions that altered downstream flows adversely affected their habitats (USFWS 1994a). Current threats to the species include small-scale loss and alteration of habitat resulting from development projects, flood control, anthropomorphic breaching of coastal lagoons, and freshwater withdrawal, and predation by and competition with native and non-native species (USFWS 2007). The 5-year review conducted by USFWS (USFWS 2007) recommended that the tidewater goby be downlisted to threatened because the species has been found to occupy many more locations that previously thought, and because habitat destruction and alteration is now generally prohibited in their habitat. Although USFWS proposed to downlist tidewater goby in 2014 from endangered to threatened (USFWS 2014), the proposal has not been finalized. Critical habitat was first designated for the tidewater goby in 2000 then revised in 2008 (USFWS 2008) and revised again in 2013 (USFWS 2013), but AG Creek lagoon is not within designated critical habitat. However, a recovery task outlined in the tidewater goby Recovery Plan is to improve habitat and reduce threats to tidewater gobies in AG Creek lagoon (USFWS 2005).

The tidewater goby ranges from Tillas Slough near the Oregon border south to Cockleburr Canyon in northern San Diego County (USFWS 2007). Tidewater gobies are thought to occur as metapopulations along the California coast, and some local populations experience intermittent extirpations that become recolonized by nearby extant populations (Lafferty et al. 1999a,b).

Habitat Requirements and Life History – Tidewater gobies occur in coastal lagoons and brackish marshes and estuaries that are seasonally disconnected from tidal action when sand bars form at the ocean (Moyle 2002). They are adapted to and occur in a broad range of water quality parameters, which likely reflects an underlying distribution of these variables in waters that have infrequent, occasional connectivity to tidal fluctuations (USFWS 2005). They rarely occur in freshwater habitats but occasionally enter marine environments when flushed out of lagoons, estuaries, and river mouths by normal breaching of sandbars following storm events. These events can disperse tidewater gobies along the coast and have been known to result in recolonization of extirpated localities within several kilometers of extant populations (Lafferty et al. 1999a,b).

Population sizes can have large variations throughout the year, plummeting directly after flood and breaching events, and then quickly recovering in summer (Moyle 2002). Physical habitat characteristics associated with tidewater gobies include sand and mud substrate, and habitats ranging from areas void of vegetation to areas thick with emergent vegetation (Chamberlain

2006). Open water is used for reproduction and vegetated areas are critical for juvenile rearing and overwintering, as they provide refuge from high flows (Moyle 2002). Eggs in burrows and the planktonic larvae are susceptible to entrainment during flood and breaching events; therefore, survival is greater where there is infrequent breaching and exposure to tidal influence and/or availability of off-channel sloughs to serve as a refuge from high-velocity waters (Chamberlain 2006). Juvenile life stages have low physiological tolerance to abrupt salinity changes, therefore, unseasonal breaches that change water quality from brackish to marine salinity results in mortality of juveniles (Hellmair and Kinziger 2014). Unseasonal breaches have been shown to result in mortality of all life stages of tidewater goby (Swift et al. 2018). Juvenile and adult life stages are more tolerant of flooding and breaching in late fall/winter. Summertime fish kills have also occurred due to high winds that mix stratified water with high nutrient levels near the bottom, resulting in phytoplankton blooms that die and decompose, resulting in hypoxic conditions (Feyrer et al. 2024). Juvenile and adult life stages are more tolerant of flooding and breaching in late fall/winter.

Tidewater gobies generally live for only one year (Moyle 2002). Reproduction occurs in waters between 48.2–77°F (9–25°C) and at salinities of 2–27 ppt (Swenson 1999). Male gobies dig breeding burrows in April or May after lagoons become disconnected from the ocean (Swift et al. 1989, Swenson 1995). Spawning can occur from April through November, although there are usually distinct peaks, often in spring and late summer (Swenson 1999). Females lay 6 to 12 clutches per year (Swenson 1999), with 300–500 eggs per clutch (Swift et al. 1989). The males guard the eggs in the burrow for approximately 9–11 days until they hatch. After hatching, the larvae are planktonic for 1–3 days, after which they become benthic (Moyle 2002).

Tidewater gobies feed on small crustaceans (mysid shrimp, gamarid amphipods, ostracods), and aquatic insects, especially chironomid midge larvae (Moyle 2002). Predators of tidewater gobies include native fish species such as small steelhead (*Oncorhynchus mykiss*), prickly sculpin (*Cottus asper*), and staghorn sculpin (*Leptocottus armatus*) (Swift et al. 1989) and may include nonnative fish species such as sunfishes (*Lepomis* spp.), basses (*Micropterus* spp.), centrarchids, and catfish and bullheads (Ictaluridae) (USFWS 2005).

Habitat and Occurrences in Arroyo Grande Creek/Lagoon – Potential tidewater goby habitat is limited to Arroyo Grande Lagoon upstream to the point where AG Creek transitions from ponded or low flow areas to fast moving riffles (Christopher 2010). The lagoon contains a small, intermittent population of tidewater goby that is likely recolonized periodically by larger, more stable populations found in Pismo Creek and Santa Maria River (both of which are designated as critical habitat) (USFWS 2008). The population may be limited by the presence of non-native predators that are known to occur in the lagoon, including American bullfrog (Rischbieter 2006, Christopher 2010) and non-native fish (Christopher 2010). Tidewater gobies were not found in Arroyo Grande Lagoon during surveys conducted in 2003 and 2004 but were found in March 2005 (USFWS 2005). Winter flood flows in 2005 noticeably modified the habitat and lengthened the lower portion of the creek, and gobies may have recolonized from one of the nearby populations (USFWS 2005). A single juvenile/post-larval goby was collected from the lagoon in 2006, the first indication of natural goby reproduction at this location, although it was only one of two gobies captured in the lagoon (Rischbieter 2007). Approximately 100 adults, 1,000 larvae, and 1,000 juveniles were found in the lagoon in 2007 (CNDDB 2025). In 2008–2009, the population was at very low numbers presumably due to drying up of the lagoon, as tidewater gobies were not at all detected during surveys in both years with the exception of a dead goby in 2008 (Rischbieter 2008, 2009a). Tidewater gobies recolonized the lagoon in 2010 and were apparently reproducing, as small numbers of juveniles were detected in surveys conducted in April, June, August, and October (<10 individuals per survey; Rischbieter 2010). Six juvenile

gobies were detected in a survey conducted in October 2011 but not in the three surveys conducted earlier that year (Rischbieter 2011). They were present in 2012, increasing in abundance over the year (hundreds of thousands in September) (Rischbieter 2012), were present again in 2013 but declined in abundance over the year, and were abundant (dozens to hundreds) in surveys conducted in April, May, June, September, and December 2014 (Rischbieter 2014). The presence of a relatively deep pool in the lagoon in 2014 was credited for providing excellent refuge for the species. Tidewater gobies persisted through most of 2015 while the lagoon sandbar remained closed to the ocean, and hundreds of gobies were detected in surveys conducted in February and April, increasing to thousands in June, and hundreds again in August and October. In December 2015, however, the lagoon was subject to intense surf and storm waves that broke the sandbar, connecting to the lagoon pool to the ocean for the first time in almost a year, and tidewater gobies were conspicuously absent in the December survey (Rischbieter 2016). Tidewater gobies remained absent for the early part of 2016 but were detected in small numbers again starting in April, likely survivors from the lagoon's previously thriving population (Rischbieter 2017). The population continued to increase through 2016 and was once again well-established in the lagoon by December 2016 (Rischbieter 2017). Tidewater goby continued to thrive in the lagoon through 2017 and were detected in dozens to hundreds in surveys conducted in March, June, July, and October (Rischbieter 2018). In 2018, they were again detected in every survey and increased to thousands in the latter half of the year (July and October surveys) (Rischbieter 2019). Again in 2019 tidewater goby were detected in every survey (February, April, July, and September) with evidence of nesting and rearing in the lagoon and persisted through a fish-kill in September possibly caused by anoxic conditions (Rischbieter 2020). Tidewater goby continued to thrive in the lagoon through 2020, with over 20,000 individuals detected in the September survey (Rischbieter et al. 2020a–d). In the early part of 2021, tidewater goby were still present but their numbers were diminished following winter storms, and they continued to persist despite loss of aquatic habitat attributed to excavation dewatering at the South SLO County Sanitation District facility in the latter part of the year (Rischbieter et al. 2021a–c). Tidewater goby persisted through unusually low water conditions in the first several surveys in 2022 (February, June, and September) with conspicuous burrows documented in June. Substantial rains and runoff occurred in December, and none were detected in the December survey although the lagoon had not yet breached the sandbar (Rischbieter et al. 2022a–d). In 2023, the lagoon underwent large-scale disturbance from one or more damaging floods occurring in late December 2022 and January 2023 that created a new mouth for AG Creek and simultaneously disconnected and isolated the long-established back-beach lagoon from the main flow of the creek (Rischbieter et al. 2023a–d). The new mouth of the lagoon remained open to the ocean for nearly the entire year in 2023 through 2024, and the tidewater goby population has persisted in the isolated back-beach lagoon through both years (Rischbieter et al. 2023a–d, 2024a–d).Tidewater goby appear to have a resilient population in AG Creek lagoon surveys and the dynamic nature of the lagoon system.

The HCP conservation program includes measures such as changes to releases from Lopez Dam to AG Creek, a measure to improve migration opportunities and habitat for steelhead downstream of Lopez Dam. The HCP also includes assisted migration for steelhead to access habitat upstream of Lopez Dam. The winter migration flow program is designed to avoid impacts to downstream ecosystems and species because of concern that inappropriately timed increased winter flows could result in breaching of the berm and lead to individual and population-level effects to tidewater goby. Avoidance of impacts to both tidewater goby and its habitat will be achieved by implementing the winter migration flow releases with the following conditions:

1. The HCP winter migration flow releases (December 1- May 1) will not contribute to conditions that could result in take of tidewater goby because the releases will only occur

if conditions in the watershed are such that other tributaries, i.e., Tar Spring and Los Berros creeks, are already contributing discharge to AG Creek such that the berm separating the lagoon from the ocean is naturally open. With the lagoon already open to the ocean, the winter migration flow releases will not cause the sudden flushing of the lagoon and should not exacerbate flushing of young tidewater goby from the lagoon.

2. The Lopez migration releases will only occur when triggered by flows from tributaries contributing to discharge in AG Creek at AG gage (RM 7) are at 25 cfs for >48 hours to ensure migration flows are synchronized with natural flow events in watershed. Therefore, HCP winter migration releases from Lopez Dam will mimic more natural conditions in the lagoon habitat where tidewater gobies live.
3. HCP summer baseflows will mimic conditions that likely occurred before Lopez Dam was built; surface flows from the upper watershed typically went subsurface before reaching the lagoon, in part due to naturally low summer flows and also due to effects of geology on surface and groundwater continuity. It is unlikely that summer baseflow releases from Lopez Dam will result in unseasonal berm breaches during the time when tidewater goby spawn and early larval rearing occurs. Summer breaches will be avoided because they are likely to contribute to unsuitable habitat conditions for tidewater goby larvae, as they do not tolerate rapid changes in salinity from brackish to marine conditions (Hellmair and Kinziger 2014). Higher late spring and summer baseflows would increase the risk of summer breaches. Such unseasonal berm breaches would be likely to harm tidewater goby.

The HCP conservation program may result in an increase in numbers of juvenile steelhead in the AG Creek watershed, and juvenile steelhead are one of many native and non-native fish predators on tidewater goby that are known to occur in the AG Creek lagoon. However, because tidewater goby are adapted to variability in temperature and salinity (including hypersaline and low dissolved oxygen) that are conditions unsuitable for juvenile steelhead, and are typically associated with shallow water habitats with vegetation that provides cover and protection against predators that require deeper water habitats, an increase in steelhead in the lagoon associated with HCP conservation measures is unlikely to have a significant impact to the tidewater goby population in the lagoon. Increased abundance of steelhead in the AG Creek watershed due to the HCP's conservation program does not necessarily equate to an increased number of juvenile steelhead in the lagoon. Moreover, there are a number of factors outside of District control that influence the likelihood that tidewater goby would be predated by juvenile steelhead, such that it would be difficult—if not impossible—to determine whether implementation of a particular conservation measure by the District was the proximate cause of death or injury to tidewater goby due to predation by juvenile steelhead.

Because it is unlikely that the HCP's conservation measures will be the proximate cause of direct or indirect impacts to tidewater goby or their habitat, the District is not including tidewater goby as a Covered Species in the HCP.

Least Bell's Vireo

The least Bell's vireo (*Vireo bellii pusillus*) was listed as endangered by the State of California in 1980, and by the USFWS in 1986 (USFWS 1986). Critical habitat for the species was designated in 1994 (USFWS 1994b) but does not include the AG Creek watershed.

Distribution – The least Bell's vireo is a small neotropical migratory songbird that is sparsely distributed along waterways in southern California and northern Baja California, Mexico (Brown 1993). In California, the least Bell's vireo was historically distributed throughout much of the

state, including the Central Valley, the central and southern Coast Ranges, local areas of the eastern Sierra Nevada, and the southwestern part of the state (Franzreb et al. 1994, Kus 2002). Extensive riparian habitat destruction and declines in nest survival caused by heavy parasitism by the brown-headed cowbird (*Molothrus ater*) resulted in severe population declines (Franzreb et al. 1994, Kus 2002). Riparian habitat in California is estimated to have declined by up to 98% since European contact (RHJV 2004), and habitat fragmentation and conversion of adjacent uplands to agriculture increased cowbird parasitism rates. Habitat fragmentation also had the effect of isolating subpopulations and made them more susceptible to extirpation (Kus et al. 2010). As a result, the species was extirpated from most of its former range, becoming restricted primarily to a few small remnant populations in riparian drainages in the eight counties south of Santa Barbara, with the greatest abundance of least Bell's vireos occurring in San Diego County (Franzreb et al. 1994).

Since the species was listed, recovery efforts, including riparian habitat restoration and cowbird trapping in core population areas, have resulted in increases in least Bell's vireo populations in some areas of southern California, and the species appears to be expanding its range northward. Small numbers of singing individuals have recently been detected in the species' historical range, including SLO, Tulare, Merced, Yolo, and Sacramento counties (Kus 2002, Padley 2010, Rottenborn 2007).

Habitat Requirements and Life History – The least Bell's vireo is characterized as a riparian-obligate breeder (Kus 1998), using dense thickets of early-successional willow shrubs and other low bushes along perennial or ephemeral streams (Franzreb et al. 1994, Kus et al. 2010). Ideal nesting habitat includes a wide (>250 m) riparian corridor with dense shrub growth extending vertically from 0.6 to 3 m, few trees greater than 8 cm diameter at breast height (dbh) in the canopy, and an open canopy (Kus 2002, Sharp and Kus 2006, Kus et al. 2010). These structural characteristics of the habitat are more important than vegetation composition. Least Bell's vireos build their nests near the edge of vegetation patches in the forks of low branches in dense shrubs or small trees. The majority of nests in California are built in willows, but a wide variety of other vegetation including coast live oak, California blackberry, Mexican elderberry, poison oak, and non-native trees are also used. Bell's vireo nests are pendulous cup nests, typically located approximately 1 m above the ground (Kus et al. 2010). Upland vegetation adjacent to riparian habitats is frequently used for foraging and sometimes nesting (USFWS 1998). Bell's vireos arrive on their breeding grounds in mid-March, and the nesting season in California runs from early April through July. Least Bell's vireos exhibit high breeding site fidelity, returning to the same territory, and even nesting in the same shrub, over multiple years (Kus 2002).

Migrating least Bell's vireos utilize a variety of habitat types including coastal scrub, riparian corridors, and woodland habitats. The winter range of the least Bell's vireo extends from southern Baja California and southern Sonora south to northern Central America. On their wintering grounds, Bell's vireos can be found in both riparian and upland vegetation, including tropical deciduous forest and tropical scrub in the southern coastal portions of the winter range, although they generally remain near waterways (Kus et al. 2010).

Habitat and Occurrences in Arroyo Grande Creek/Lagoon – Least Bell's vireos have not been reported in AG Creek watershed. However, they could occur in the plan area and permit area, as suitable nesting habitat occurs in the riparian vegetation along AG Creek. The nearest reported sighting of least Bell's vireo was several miles north of AG Creek, in willows along Pecho Road in Los Osos (SLOCOBIRDING 2009, as cited in SWCA 2010). They have also been reported along the Salinas River; a male and a breeding pair were observed in spring of 2005 although breeding was not detected during protocol-level surveys (CNDDB 2025).

Within the larger SLO County, six eBird sightings of Least Bell's vireo have been reported between 2007 and 2023, with three in Montaña de Oro State Park (eBird 2025). Five of these records pertain to fall migrants, and the remaining bird was only sighted on one day, indicating it was not a breeding bird.

In addition to the low likelihood that Least Bell's vireo occurs regularly within the plan area of the HCP, HCP Covered Activities (Section 4.3 Maintenance and Operations) and conservation measures (Section 5.4, CM-1, CM-2, CM-3) are unlikely to affect Least Bell's vireo because riparian disturbances are unlikely and, if they occur, would be temporary in nature. Change in Lopez Dam discharge through the LDRP (CM-1, Section 5.4.1) would be the only activity that may impact riparian habitat, but impacts are not expected as changes in WSE are estimated to be small, e.g., the largest change expected is on the order of <4.5 inches in WSE when going from peak winter migration flows (20 cfs) to lowest spring baseflows (5 cfs).

Although Least Bell's vireo may occasionally disperse through the plan area, the plan area is not considered to contribute substantially to the species' essential behavioral patterns, including substantially contributing to breeding, feeding, or sheltering. As a result, Covered Activities are unlikely to affect the species or their habitat.

Foothill Yellow-Legged Frog

The foothill yellow-legged frog (*Rana boylii*) consists of six DPS. The South Coast DPS and South Sierra DPS were classified as federally endangered in 2023 as a result of declining stream occupancy, rapid reductions in occupied range and predicted inability to survive a catastrophic event (USFWS 2023b). The North Feather DPS and Central Coast DPS were listed as threatened; the North Coast DPS and North Sierra DPS were not listed (USFWS 2023b). Current threats to the species include altered waterflows related to infrastructure and habitat conversion, competition with and predation by nonnative species, as well as environmental changes related to climate change. Critical habitat has been proposed for the foothill yellow-legged frog (USFWS 2025), but the covered lands are not within proposed critical habitat.

Distribution – The foothill yellow-legged frog lives in foothill and mountain streams from the Pacific Coast to the western slopes of the Sierra Nevada and Cascades mountains, up to approximately 5,000 ft in elevation. The historical range of the foothill yellow-legged frog range extended from the Willamette River drainage in Oregon, south to the San Gabriel Mountains in southern California. Today, the frog's range generally follows the historical distributions, but some parts of the range have contracted, especially the southern ends of the South Coast DPS and South Sierra DPS.

Foothill yellow-legged frogs in Arroyo Grande are in the endangered South Coast DPS. The South Coast DPS is primarily found in the Coast Ranges of California, particularly west of the Salinas Valley, extending into SLO County. They have been extirpated from all coastal streams south of SLO County.

Habitat Requirements and Life History – Foothill yellow-legged frogs are obligate stream-dwelling frogs (Wheeler and Welsh 2008) that use aquatic habitat for feeding, reproduction, and development and terrestrial habitat near streams for foraging, overwintering, and dispersal. They occur in a wide variety of vegetation types including hardwood, hardwood-conifer, mixed conifer, riparian, ponderosa pine, mixed chaparral and wet meadows (Hayes et al. 2016). While habitat conditions can vary among stream habitat and across the species' geographic range, only a

narrow range of abiotic conditions are tolerated by early life stages (Kupferberg 1996, Bondi et al. 2013, Lind et al. 2016, Catenazzi and Kupferberg 2018) including stream velocity, water depth, water temperature, and streambed substrate.

Most foothill yellow-legged frogs breed along mainstem water channels and overwinter along smaller tributaries near the mainstem channel (Kupferberg 1996, GANDA 2008). Breeding stream habitat is typically shallow, rocky and at least partially exposed to direct sunlight. In general, foothill yellow-legged frog breeding takes place between late March and early July (Zweifel 1955, Yarnell et al. 2013).

Foothill yellow-legged frog diet varies by life stage with tadpoles consuming algae, diatoms, and detritus scraped from rocks and vegetation (Ashton et al. 1997, Fellers 2005). Metamorphs, juveniles, and adults feed on a wide range of invertebrates including snails, moths, flies, water striders, beetles, grasshoppers, hornets, arthropods, and ants, as well as small fish and small frogs (Zweifel 1955, Nussbaum et al. 1983). Their prey have been found to be primarily terrestrial as opposed to aquatic (van Wagner 1996).

Predators of foothill yellow-legged frogs include several native and nonnative species. The American bullfrog is considered a threat to all four listed DPSs. Fish such as smallmouth bass, green sunfish (*Lepomis cyanellus*), mosquitofish (*Gambusia affinis*), and steelhead/rainbow trout (*O. mykiss*) are predators of foothill yellow-legged frogs and may also compete with them for food resources (Hayes et al. 2016). Several nonnative crayfish species such as the signal crayfish (*Pacifastacus leniusculus*) also prey upon early life stages of foothill yellow-legged frog.

Habitat and Occurrences in Arroyo Grande Creek/Lagoon – Foothill yellow-legged frogs are believed to be extirpated from the AG Creek watershed since 1975–1978 (CNDDB 2025). There are three CNDDB occurrences of foothill yellow-legged frogs prior to the construction of Lopez Dam: tadpoles collected in 1940 about four miles upstream from Arroyo Grande, and two individuals collected in 1953 and 1963 about nine miles northeast of Arroyo Grande. They were not found in southern California during surveys in 1981–1993, 1988–1991, or 2011–2014 (CNDDB 2025). Because they are believed to be extirpated in the plan area, it is unlikely that Covered Activities will impact foothill yellow-legged frogs or their habitat, and for that reason the District is not including foothill yellow-legged frogs as a Covered Species in the HCP.