

Appendix L
Fish Habitat Assemblage Data

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Introduction

The following section details the native and nonnative fish assemblages and in-stream aquatic habitat types throughout the major stream systems in the study area that are shown in **Figure 3-12** and described in detail in the section below. The figure illustrates the distribution of the native fish assemblages and riverine habitat types that occur in the study area.

Fish Habitat Assemblages

To characterize the stream reaches for the purposes of the impact analysis and conservation strategy, a map was developed of native and non-native fish assemblages and aquatic habitat types throughout the major stream systems in the study area. Data was first developed to support SCVWD's Stream Maintenance Program. Dr. Jerry Smith of San José State University updated the map in July 2006 for the Science Advisors report of the Habitat Plan to reflect barrier removal and sampling results that occurred in the intervening years since the original map was created (Spencer et al. 2006). The map was then further revised and updated in 2007 by Dr. Smith and Jae Abel, a senior fisheries biologist at SCVWD. Jae Abel then adapted the map so that it corresponded to the new GIS stream data layer developed for the study area by SCVWD in early 2007. The stream categories emphasize habitat conditions for, and distribution of, steelhead trout and Chinook salmon. Ten categories were defined of fish assemblages and aquatic habitat types. These habitat categories are described as follows:

- **Estuarine.** Lowermost reaches of streams where conditions are saline and tidal (e.g., Guadalupe Slough, lower Guadalupe River, and lower Coyote Creek).
- **Cold Steelhead and Cold Steelhead—Extent Unknown.** A small portion of this habitat is on undammed tributaries, such as Tar, Bodfish, and Little Arthur creeks (tributaries of Uvas Creek); Cedar Creek (tributary of Pacheco Creek); Arroyo Aguague (tributary of Upper Penitencia Creek); and possibly the upper South Fork of Pacheco Creek. However, most of the remaining steelhead habitat in the study area is downstream of reservoirs on Los Gatos, Guadalupe, Alamitos, Arroyo Calero, Coyote, Upper Penitencia, Llagas, Uvas, and Pacheco Creeks. The mapped stream segments in this category

normally provide an appropriate mix of: (1) relatively cool water (rarely above 22–24°C); (2) high stream flow to provide fast-water feeding habitat for steelhead; (3) relatively clean, coarse substrate for insect production; and (4) sufficient sun and water clarity to provide for algal growth (as a base of the food chain) and to allow steelhead to feed on drifting insects in fast water (Smith 1982, 2007; Smith and Li 1983). Much of the stream habitat in this category (downstream of reservoirs) is warmer than typical trout habitat, but the high summer stream flows, due to reservoir releases, allow steelhead to feed sufficiently on drifting insects to cope with the metabolic costs of the warmer water (Smith and Li 1983). Steelhead downstream of reservoirs in summer are found almost exclusively in fast-water habitat in riffles, runs, and heads of pools and often reach smolt size in one summer (Smith 1982, 2007; Smith and Li 1983). A variety of native fish species, including Pacific lamprey, are usually present in this habitat in upper tributaries and downstream of reservoirs.

- **Cold Trout and Cold Trout—Extent Unknown.** These are perennial habitats upstream of reservoirs where conditions are sufficiently cool to support resident rainbow trout, often with California roach, Sacramento sucker, and riffle sculpin present. Prior to reservoir construction, most of these habitats supported steelhead and possibly some salmon. Pacific lamprey is another anadromous species of concern that is presumed absent from this habitat upstream of the reservoirs. However, lampreys are able to ascend the spillway at Uvas Reservoir (Smith 1982) to utilize upper Uvas Creek. Resident trout are also present above natural and smaller artificial barriers on Smith, Bodfish, Little Arthur, and Upper Penitencia Creeks.
- **Warm Potential Trout/Steelhead.** These habitats are usually farther downstream of reservoirs than the cold steelhead reach and are often deficient in one or more of the four factors listed above for Cold Steelhead. Higher water temperatures increase steelhead food demands, often sufficiently to starve the fish. Variable year-to-year stream flows or reduced stream flows due to percolation reduce the fast-water feeding habitat that steelhead need to meet the metabolic demands of high temperature. Insect production is low due to poor substrate, turbidity, or low stream flow. Feeding is reduced by heavy shading or high turbidity. Management for increased stream flows or reduced water temperatures downstream of reservoirs in this zone may make the habitat more regularly suitable for steelhead. Often, warm-water native fish (see below) tend to dominate in this habitat type, with any juvenile steelhead scarce and/or strongly restricted to suitable fast-water feeding habitat.
- **Warm Native.** These habitats are dominated by native warm-water fishes, often including Sacramento sucker, hitch or California roach, Sacramento pikeminnow, threespine stickleback, and prickly sculpin. Most of the mapped reaches contain at least three to four of the above species as the minnow-sucker association of Smith (1982). North Fork Pacheco Creek (above the reservoir) and Upper Silver Creek (tributary of Coyote Creek) contain roach associations, dominated by California roach, with relatively scarce stickleback (Upper Silver Creek) or Sacramento sucker and prickly sculpin (North Fork Pacheco Creek). The third potential native warm-water fish community is the Sacramento perch (*Archoplites*

interruptus)/Sacramento blackfish community (Smith 1982). This low-gradient stream association is absent from the study area and from the rest of California because of the scarcity of Sacramento perch and the dominance of even high-quality downstream habitats by introduced fishes, including sunfishes and common carp (*Cyprinus carpio*). Foothill yellow-legged frogs and California red-legged frogs can occur in relatively undisturbed reaches of the warm native, cold steelhead, and cold trout zones.

- **Mixed Native—Salmon.** Chinook salmon currently spawn in Coyote Creek and the Guadalupe River and its tributaries. Some of the reaches they use are mapped as Cold Steelhead or Warm Potential Trout/Steelhead, indicating the higher quality year-round habitat that steelhead are potentially able to use for rearing. However, because Chinook spawn in early winter and juveniles migrate to the ocean in their first spring, Chinook are able to use habitats that turn very warm or have low water quality in summer. Most of these habitats also have a fish community composed of a mixture of native species (Sacramento sucker and hitch) and introduced species (carp and red shiner [*Cyprinella lutrensis*]).
- **Mixed Native.** These warm-water habitats contain a mixture of native and introduced species. This assemblage occurs in lower portions of Coyote and Llagas Creeks and Guadalupe River, the Pajaro River, and most pond and reservoir habitats. Native tule perch (*Hysterocarpus traski*) have apparently been reintroduced to Coyote Creek via the pipeline from San Luis Reservoir; they are present in the on-channel Ogier Ponds.
- **Managed Reservoir.** These artificial habitats provide warm-water lake conditions, a habitat type originally rare in the study area. These habitats are primarily occupied by sport fishes and other warm-water introduced species such as green sunfish, redear sunfish (*Lepomis microlophus*), pumpkinseed sunfish (*L. gibbosus*), crappie (*Pomoxis* spp.), bluegill (*Lepomis macrochirus*), largemouth bass, bullhead (*Ameiurus* spp.), white catfish (*Ameiurus catus*), and channel catfish (*Ictalurus punctatus*). Forage for the predatory fishes has usually included introduced threadfin shad (*Dorosoma petenense*), inland silverside (*Menidia beryllina*), golden shiner (*Notemigonus crysoleucas*), and crayfish. Some native fishes, including Sacramento sucker and Sacramento blackfish, can be abundant in the new habitats, but most native species do poorly when facing competition and predation from the introduced fishes.
- **Fish Scarce.** These habitats are normally dry during summer and fall. However, they may serve as migration routes for steelhead and other fishes and/or as reproductive habitat for rapidly developing amphibians such as tree frogs (*Pseudacris [Hyla] regilla*) or western toads (*Bufo boreas*).
- **No Data.** Fish species present are unknown, but may have fisheries values.
- **No Data/Probably No Value.** Fish species present are unknown, but because of location or habitat conditions the reach is unlikely to have habitat value for fish. A majority of the No Data or No Data/Probably No Value stream reaches are seasonal streams, extreme headwaters, or highly modified urban channels.

Table 3-8 documents the relationship of the native fish communities to covered species and selected native fish.

Habitat Plan Analysis Categories

The fish community designations were aggregated into two categories for analysis and conservation purposes related to the riverine land cover type under the Habitat Plan as follows:

- **Category 1—Fish bearing streams.** Includes all perennial and intermittent stream reaches that have sufficient flow to support cold and warm water native fisheries. Also includes all in-channel ponds and reservoirs. Also includes any Category 2 streams downstream of the Category 1 designation.
- **Category 2—Non-fish bearing streams.** All intermittent and ephemeral stream reaches that do not support native fisheries and are not downstream of reaches in Category 1. Also includes reaches with no data that likely do not support native fish. Would provide minimum protection to support water quality function under the Habitat Plan.

The stream categories (**Figure 3-12**) were derived from the fish community designations as a methodology for simplifying the impact analysis and conservation strategy while retaining the value of the underlying habitat information. This will allow for the underlying biological information to inform and guide the Habitat Plan, while allowing the categories that drive the conservation strategy and conditions on covered activities to provide maximum protection and conservation for habitats anticipated to improve during the permit term.

Canals and ditches were included in the riverine land-cover type due to their similar function to degraded streams and their very low acreage in the study area. Due to the nature of these man-made structures, canals and ditches are often managed for minimal vegetation to enhance the flow of water through the channels. However, canals that cross serpentine areas (e.g., Coyote Ridge, Santa Teresa Hills) often support several covered species including Santa Clara Valley dudleya, most beautiful jewelflower, smooth lessingia, Mt. Hamilton thistle, and California red-legged frog. Garter snakes and some ducks use canals and ditches throughout the study area.

References

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