Chapter 8. Fish

Environmental Setting

Several of the nine California RWQCB regions (Figure 1-1) are similar in either fish species or aquatic habitat present; therefore, the fisheries setting is discussed according to three regional groupings: Pacific coast (Regions 1-4, 8, and 9); western Sierra Nevada and Central and San Joaquin Valleys (Region 5); and eastern Sierra Nevada, Great Basin, and Colorado River (Regions 6 and 7).

Regions 1-4, 8, and 9: Pacific Coast

Regions 1-4, 8, and 9 encompass all the Pacific coastal drainages in California. In addition, San Francisco, San Pablo, and Suisun Bay drainages are included in Region 2, as is part of the Sacramento-San Joaquin Delta. Coastal California streams, which usually have steep drainages and a high gradient, are characterized by extreme seasonal variation in flow (Moyle 1976). Many flood in winter but become intermittent in summer. Fishes native to these streams are adapted to these conditions. The northern regions (i.e., Regions 1 and 2) receive the most annual rainfall (see Chapter 3, "Soils, Hydrology, and Water Quality"), and streams in these regions are more likely to be colder and perennial compared to those in the southern regions (Moyle 1976). Despite the latitudinal differences, protected fish species in most of the coastal regions tend to include tidewater goby in the lower reaches of streams; anadromous chinook and coho salmon, steelhead, and lampreys in the middle reaches (anadromous species live most of their adult life in the ocean but return to fresh water to spawn); and a few suckers and minnows in the middle and upper reaches.

Special Considerations

The GO prohibits application of biosolids in three areas of Region 2: the Sacramento-San Joaquin Delta, as defined in Water Code Section 12220; Suisun Marsh, as defined in Public Resources Code Section 29101; and the jurisdiction of the San Francisco Bay Conservation and Development Commission, as defined in Government Code Section 66610. The GO also prohibits application of biosolids in the Santa Monica Mountains Zone of Region 4, as defined by the Government Code, Section 33105, and in the

California Coastal Zone, which is generally defined in the Public Resources Code, Section 5093.5, as land extending 1,000 yards inland from the mean high tide line of the ocean. These prohibitions would avoid potential impacts on protected fishes located in these areas (e.g., Delta and longfin smelt and Sacramento splittail in the Sacramento-San Joaquin Delta [Region 2] and southern steelhead in Malibu Creek [Region 4]).

Region 5: Western Sierra Nevada and Central and San Joaquin Valleys

Streams of the western Sierra Nevada are included in the Sacramento-San Joaquin River drainage, which ultimately empties into San Francisco Bay. This large drainage is isolated by mountains on all sides and supports a variety of aquatic habitat types; consequently, it contains several endemic fish species (Moyle 1976). Streamflow depends primarily on snowmelt but is moderated by major dams on all large rivers except the Cosumnes River. Flow tends to be more constant than in coastal streams; it is greatest in winter and spring and least in summer and fall. Protected species inhabiting western Sierra Nevada and Central and San Joaquin Valley streams and rivers include steelhead, salmon, trout, minnows, suckers, sculpins, and Sacramento perch. Clear Lake (Lake County), the largest natural lake in California, is located in Region 5, as is part of the Sacramento-San Joaquin Delta. Clear Lake is important habitat for Sacramento perch and other native fishes.

Special Considerations

The GO prohibits application of biosolids in the Sacramento-San Joaquin Delta, as defined in Water Code Section 12220. Impacts on protected fish species (e.g., Delta and longfin smelt, Sacramento splittail) occupying this area therefore would be avoided.

Regions 6 and 7: Eastern Sierra Nevada, Great Basin, and Colorado River

Regions 6 and 7 encompass the portion of California that is drained internally. Except for water in the Colorado River drainage in Region 7, surface water from these regions does not flow to the sea. Streams tend to originate in mountainous areas and flow downstream into the Great Basin, where the water ultimately evaporates. This typically results in terminal lakes (e.g., Mono Lake) or sinks that are quite warm and saline (Moyle 1976).

Many Great Basin fish (e.g., pupfish) are adapted to extreme conditions. Trout are present at higher elevations although steep gradients often result in cool water temperatures, and hence the presence of trout, at lower elevations (Moyle 1976). Lake Tahoe and Eagle Lake in Region 6 are cool, higher elevation lakes that are important habitat for native fishes. As with the Sacramento-San Joaquin River drainage (i.e., Region 5), isolation of many portions of the eastern Sierra Nevada and Great Basin areas of California has resulted in several endemic fish species. The Colorado River drains a large portion of the southwestern United States and empties into the Gulf of California. Historically, it was deep and sediment laden with areas of strong current and marshes (Moyle 1976). Fish species native to the California portion of the Colorado River are well adapted to these conditions. However, aquatic habitat in the Colorado River has been greatly degraded by construction of dams and use of water for irrigation, which has reduced fish populations; all the native fishes in the California portion are now protected. Overall, protected fish species found in Regions 6 and 7 include trout, minnows, suckers, and pupfish.

Special Considerations

The GO prohibits application of biosolids in specified locations within six areas of Region 6: Glenshire and Devonshire subdivisions, Town of Truckee; the area southwest of Piute Creek and north of the Susan River; Eagle Lake basin; the Mono-Owens Planning Area; the Antelope Valley Planning Area; and the Mojave River Planning Area. Impacts on protected fish species occupying these areas therefore would be reduced or avoided. Regions 6 and 7 contain several protected species that not only are endemic but have very small ranges or population sizes. These species are inherently at higher risk of extinction. In addition, in the internally drained areas of Regions 6 and 7, pollutants are more likely to become concentrated in terminal lakes and sinks because they are not flushed into the ocean.

Impacts and Mitigation Measures

Approach and Methods

The GO was reviewed to identify setbacks from water bodies and other provisions related to water quality. Chapter 3, "Soils, Hydrology, and Water Quality", was reviewed to determine the GO's effects on surface water quality. Impacts on fisheries were assessed based on water quality effects.

Thresholds of Significance

Impacts on aquatic resources were considered significant if they would:

- directly or indirectly reduce the growth, survival, or reproductive success of individuals or species listed or proposed for listing as threatened or endangered under the federal or California ESA;
- directly or indirectly reduce the growth, survival, or reproductive success of substantial proportions of rare or special-concern species populations, or regionally important commercial or game species; or
- substantially reduce the quality and quantity of important habitat for fish species or their prey.

Impacts of Agricultural Use

Impact: Potential for Acute Toxicity to Fish from Leaching of Biosolids Constituents from Application Sites to Surface Waters

Surface water increases in metals, organic compounds, and nitrates resulting from land application of biosolids could be acutely toxic to fisheries, depending on the quantity of the contaminant that enters the surface water and the susceptibility of the fish species to the increased level of metals, organic compounds, and nitrates. For these elements to enter the surface water, they would have to leach into the groundwater and travel laterally at least 100 feet (because the GO prohibits land application of biosolids within 100 feet of surface waters). As described in Chapter 3, "Soils, Hydrology, and Water Quality", in most situations, land application of biosolids would not result in surface water quality degradation resulting from leaching of trace metals, organic compounds, or nitrates into the groundwater. In areas with sandy soils underlain by shallow hardpans (present in some desert regions of southern California), leachate could travel greater distances. Small water bodies with no external drainage that are habitat for protected fish species (such as pupfish) could be adversely affected. In these unique conditions, the effect could be potentially significant.

Mitigation Measure 8-1: Increase Setback from Enclosed Water Bodies If Pupfish Are Present. Proposed land applications in the habitat range of the pupfish should be reviewed for their proximity to enclosed water bodies that could be occupied by pupfish. If such water bodies are near the land application areas, setbacks of 500 feet should be required. There are several species of pupfish in California. Their current occupied habitat is confined to several small springs, Salt Creek and the Amargosa River in southern Inyo and northern San Bernardino Counties in the vicinity of Death Valley National Monument, and San Felipe Creek and the Salton Sea in Imperial County. Exact locations of habitat can be found in Moyle et al. 1989.

Impact: Potential for Reduced Fisheries Productivity Resulting from Runoff and Erosion

Land application of biosolids could increase soil erosion and thus increase sedimentation and turbidity of aquatic habitats. Temporary discharges of sediment and suspended solids could cause direct and indirect impacts on fisheries resources. Direct impacts on fish species could include increased mortality and reduced feeding opportunities for sight-feeding fish. Indirect impacts could include asphyxiation of developing eggs under sediments, degradation of spawning and rearing habitats, and decreased food production. However, land application is not expected to result in reduced fisheries productivity because increased sedimentation and water quality degradation in water bodies adjacent to land application sites would be controlled. Provisions in the GO require 100-foot setbacks from water bodies and require erosion control plans to be prepared if slopes exceed 10%. They also prohibit the land application of biosolids that could cause or threaten to cause pollution, as defined in Section 13050 of the California Water Code. Surface water runoff from a permitted application site must be controlled on-site for 30 days following application unless a 33-foot buffer strip of vegetation is present to filter the discharge. In addition, the GO prohibits the application of biosolids in areas where biosolids are subject to erosion or where washout offsite could occur. Generally, the proposed project is not expected to result in runoff and erosion. Runoff and erosion could occur in extreme situations (low-probability storm events, accidental spills), but the potential is low. This impact is considered potentially significant.

Mitigation 4-1. Mitigation Measure 4-1 in Chapter 4, "Land Productivity", would reduce this impact to a less-than-significant level.

Impacts of Other Activities

Horticultural Use

The use of biosolids for horticultural purposes (e.g., road medians, parks, and golf courses) would result in impacts on fisheries resources similar to those described above under "Agricultural Use" because the same setback from the application site to water bodies (100 feet) would be required, erosion would not affect adjacent water bodies because Mitigation Measure 4-1 would be implemented (thus, no increase in turbidity would occur), and no degradation of water quality would occur. In addition, horticultural use of biosolids as a planting or potting medium in large nursery operations would not result in impacts on fisheries resources.

Silvicultural Use

The use of biosolids for silvicultural use generally would pose a risk of impacts on fisheries resources similar to those described above under "Agricultural Use" because the same provisions required for agricultural use would be required for commercial tree operations. In some cases, silvicultural use of biosolids could have a greater risk of impact than those described above for "Agricultural Use" because slopes may be greater at these sites and the application sites could be closer to coldwater fisheries that are less tolerant of eutrophication. Under the GO, if biosolids are applied to ground surfaces having a slope greater than 10%, a report would need to be prepared that identifies specific application and management practices necessary to ensure containment of the biosolids on the application site and to prevent soil erosion. These reports shall be prepared by a certified agronomist, registered agricultural engineer, registered civil engineer, or a certified professional erosion and sediment control specialist and submitted to the RWQCB for approval before the biosolids are applied. Because erosion control plans would be prepared for areas where slopes are greater than 10%, the potential for impacts on fisheries productivity is considered less than significant.

Land Reclamation

The use of biosolids for land reclamation would result in impacts on fisheries resources that are generally similar to those described above under "Agricultural Use" because the same setback from the application site to water bodies (100 feet) would be required, erosion would not affect adjacent water bodies (thus, no increase in turbidity would occur), and water quality would not be degraded. As described above under "Silvicultural Use", an erosion control plan would be prepared for application sites that have slopes greater than 10% (therefore, although mining reclamation sites could be located in more mountainous areas than agricultural sites, erosion would not affect adjacent water bodies and fish resources). In addition, the use of biosolids as a final

cover material at landfills would not result in impacts on fisheries resources because these resources would not be present at the landfill.