Southern Steelhead

Southern Steelhead (*Oncorhynchus mykiss*)

Management Status

TNC Heritage Status Rank: G5S2 (both stocks)

Federal: Southern California Evolutionarily Significant Unit (ESU): listed as Endangered (National Marine Fisheries Service 1997), Critical Habitat Designated (National Marine Fisheries Service 2000), withdrawn & vacated (National Marine Fisheries Service 2002d), Range Extension for southern California ESU (National Marine Fisheries Service 2002c), newly Proposed Critical Habitat (National Marine Fisheries Service 2004); South-Central California Coast ESU: listed as Threatened (National Marine Fisheries Service 1997), Critical Habitat Designated (National Marine Fisheries Service 2000), withdrawn & vacated (National Marine Fisheries Service 2002d), newly Proposed Critical Habitat (National Marine Fisheries Service 2004).

State: None

Other: California Department of Fish and Game Species of Special Concern

General Distribution

West coast steelhead populations occur in 15 ESUs; these are differentiated on the basis of natural geographic boundaries that foster genetic isolation (National Marine Fisheries Service 1997). Over the past few years there have been extensive survey efforts underway by NOAA Fisheries, California Department of Fish and Game and other agencies and entities, to help identify and delineate the distribution of different genetic stocks of steelhead trout and rainbow trout throughout the state of California, especially upstream of dams (Greenwald and Campton 2005, U.S. Army Corps of Engineers 2004). These two different stocks found in the Southern California ESU and South-Central California ESU will be generally described together in this species account, however, we will have separate viability outcome statements for fish associated with each ESU.

Maps of the Southern California ESU in the *Status Review of West Coast Steelhead from Washington, Idaho, Oregon, and California* (National Marine Fisheries Service 1996) include the Santa Maria River south to the U.S. - Mexican border. The final rule on listing (62 Federal Register 43938) defines the ESU as extending south to "the southern extent of the species' range," which was defined as Malibu

Creek (National Marine Fisheries Service 1997). However, in May 2002, the species' range was revised to include systems south to the U.S. - Mexican border (67 Federal Register 21586, National Marine Fisheries Service 2002). The primary streams supporting steelhead runs in the Southern California ESU are the Santa Maria River (including Sisquoc River), Santa Ynez River, Gaviota Creek, the Ventura River, the Santa Clara River (including Sespe Creek), Malibu Creek, San Mateo Creek and Topanga Creek. Total run size in all of these streams was estimated to be fewer than 200 adults.

The South-Central ESU is described to occupy river basins from Pajaro River, located in Santa Cruz County, CA (inclusive) to (but not including) the Santa Maria River, San Luis Obispo County, CA. Most rivers in this ESU drain the Santa Lucia Mountain Range, the southernmost unit of the California Coast Ranges (62 Federal Register 43938).

Historically, winter-run southern steelhead (or coastal rainbow trout) moved up most coastal streams in central and southern California (Behnke 1992), although spawning success south of the Los Angeles Basin may have been sporadic (Swift and others 1993).

Previously, Topanga Creek was the southernmost stream recognized as supporting a steelhead population (67 Federal Register 21586). However, in April 1999, trout believed to be southern steelhead were found in a tributary of San Mateo Creek in San Diego County (Stephenson and Calcarone 1999). Tissue samples of these fish were collected for DNA analysis, which determined they were indeed southern steelhead. The Southern California ESU was extended to include this drainage (67 Federal Register 21586).

The Southern California steelhead ESU is at a high risk of extinction based on results of NOAA Fisheries' west coast steelhead status review (Busby and others 1996) and in a subsequent status update (National Marine Fisheries Service 1997). Population estimates for this ESU in its entirety are not available, although data that was available in 2002 indicated that the population is very small (National Marine Fisheries Service 2002). In a letter from NOAA Fisheries to the Division of Water Rights dated September 19, 2001, the agency stated the current run of adult steelhead in the Santa Ynez River was believed to be less than 100 adult fish per year. In the Draft EIS/EIR for the Matilija Dam Ecosystem Restoration Feasibility Study (U.S. Corps of Engineers 2004) steelhead populations in this system were estimated to be well below 200 fish. Recent information regarding steelhead abundance for the Santa Ynez, Ventura and Santa Clara Rivers suggest that the abundance estimates made at the time of the final listing were probably high (National Marine Fisheries Service 2002). Titus and others (2000) summarized information for steelhead populations based on historical and recent survey data and found that the Southern California ESU has very high percentages of declining and extinct populations (National Marine Fisheries Service 1997). The sustainability of steelhead populations in the Southern-California ESU continues to be a major concern (National Marine Fisheries Service 1997).

Distribution in the Planning Area

The South-Central California coast ESU encompasses streams that drain the northern and southern Santa

Lucia Ranges, down to (but not including) the Santa Maria River in San Luis Obispo County. The primary rivers supporting steelhead runs in this ESU are the Pajaro, Salinas, Carmel, Little Sur, and Big Sur rivers. However, an additional 15–20 smaller streams along the Monterey and San Luis Obispo coast also support steelhead. Streams specified in the final rule on this ESU that occur at least partially on National Forest System lands (all on the Los Padres National Forest) include the Little Sur River, the Big Sur River, Big Creek, Alder Creek, San Carpoforo Creek, and Morro Creek (Chubb 1998a).

Maps of the Southern California ESU in the west coast steelhead status review show it extending from the Santa Maria River south to the U.S.- Mexican border, which is confirmed now with the latest listing of the range of the ESU (67 Federal Register 21586). The primary streams supporting steelhead runs in this ESU are the Santa Ynez River, Gaviota Creek, the Ventura River, the Santa Clara River (including Sespe Creek) on the Los Padres National Forest (Chubb 1998a), and San Mateo Creek on the Cleveland National Forest.

Systematics

Many local populations of rainbow trout and steelhead are distinctive and have been given distinct taxonomic classification. The stocking of hatchery fish in streams that support native steelhead has reduced the genetic distinctiveness of native steelhead populations in California (Moyle 2002). The coastal rainbow trout subspecies is the most typical form of the rainbow trout raised in fish culture and has been introduced in waters all over the world. There are no diagnostic characteristics, morphological or genetic, that can positively separate all coastal rainbow trout from all other subspecies or geographical populations or races of rainbow trout (Behnke 2002). The earliest propagation of rainbow trout was based on diverse parental sources, although most were of the subspecies *irideus* (coastal rainbow trout), and had a large measure of steelhead ancestry from the start. The genetics associated with coastal rainbow trout and steelhead is very complicated and is still being studied at this time. In a paper by Greenwald and Campton (2005) that summarized Nielsen and others (2003), the genetic structure work for the Santa Ynez River watershed showed that the presence of genetic material in landlocked rainbow trout had a higher frequency of "native" signature compared to hatchery fish. Some key points from this synopsis are:

- The extent that introduced rainbow trout may have reproduced successfully upstream of Gibralter Dam was unknown until the Nielsen and others 2003 study. The study looked at “native” origin, hatchery origin, or a mixture of the two sources.
- Have found within mitochondrial DNA that introduced rainbow trout of hatchery-origin have successfully reproduced in Santa Ynez and other coastal populations in southern California based on common haplotypes of ‘hatchery’ populations being found.
- In the lower Santa Ynez River watershed (Cachuma Reservoir, Hilton Creek, and lower Santa Ynez) genetic samples were not significantly different from one or more hatchery strain, indicating they are largely descendents of hatchery fish.
- Fish above Juncal Dam in the upper Santa Ynez and in Alder Creek downstream of Juncal dam, appear to be influenced by introduced hatchery fish, but also retained genetic components at significant frequencies to have an apparent native genetic component.

- Four tributaries between Juncal and Gibralter dams exhibited little to no evidence of genetic influence from hatchery fish, and, therefore, appear to be derived genetically from native populations.

Steelhead habitat above dams and on National Forest System lands is generally of higher quality than below the dams (especially on the Santa Ynez River and Ventura River). Fish access to these upper watersheds could greatly expand the amount of spawning and rearing habitat, potentially increase the current population number, and maintain viability of that particular streams' population (due to presence of rainbow trout with "native" genetic material (U.S. Army Corps of Engineers 2004)).

Separate species accounts were prepared for steelhead trout and rainbow trout for this planning effort in order to discuss the management of federally listed steelhead trout (officially described as those that reside downstream of distinct barriers such as waterfalls or dams) apart from the management of rainbow trout found in inland waters (above barriers), waters that are managed as Wild Trout or Heritage Trout streams, or waters that are currently stocked by California Department of Fish and Game.

Natural History

Habitat Requirements

Major streams in southern California originate in the coastal mountains, and many cross broad alluvial areas before reaching the sea. These low-elevation alluvial flats present inhospitably warm and fluctuating temperatures, and streamflows tend to be intermittent. The higher-elevation headwaters, therefore, are the primary spawning and rearing areas for steelhead. It is likely that the largest steelhead populations historically occurred in major streams where the upstream spawning and rearing habitats were closest to the ocean, such as in the Ventura, Santa Clara, and Santa Ynez Rivers. Streams that still support steelhead runs are primarily in small drainages whose headwaters are in mountains very close to the coast (e.g., Santa Lucia Creek and the Big Sur coastal streams). These streams tend to be those without impassible barriers (e.g., dams) between spawning and rearing habitat and the ocean (Moyle and others 1995).

Typically, spawning habitat is found in stream segments with 0–1 percent gradients; foraging and dispersal habitats occur at 0–4+ percent gradients. Steelhead are found at elevations ranging from sea level to 4,500 feet (1,371 meters) (i.e., the upper reaches of Cherry Creek, tributary of Sespe Creek in the Santa Clara River watershed on the Los Padres National Forest). Only stream segments open to ocean access and without impassable natural or major long-standing anthropogenic barriers had been included in designated critical habitat (National Marine Fisheries Service 2000) prior to critical habitat being withdrawn (National Marine Fisheries Service 2002). The 2004 proposal for designating critical habitat (National Marine Fisheries Service 2004) discusses many of these same streams but the CFR also solicited public comments about stream segments upstream of some local dams.

Migrating fish require deep (1 foot [0.3 meter]) holding pools with cover (e.g., rock ledges, bubble

curtains). They move upstream in perennial or seasonal stream reaches (Carroll 1985) and seek out spawning areas in riffles or pool tails where gravel is clean and plentiful and of appropriate sizes (0.25–0.75 inches) (0.6–1.9 centimeters) (Phillips and others 1975). Streamflow must be adequate to maintain oxygen levels of at least 5 parts per million (ppm) (Bjornn and Reiser 1991) and temperatures of 37 º F–68 º F (3 º C–20 º C) (Bell 1986). Channel depths of no less than 0.8 foot (0.25 meter) are necessary, and channel dimensions with width-to-depth ratios of approximately 10–15:1 are thought to contribute to the best spawning conditions. Fine sediments should be less than 30 percent of substrate volume (Phillips and others 1975), and particulate organic matter should constitute less than 10 percent (Olsson and Persson 1986). Fry live in segregated schools primarily limited to slow water velocity (i.e., less than 3.9 inches [10 centimeters] per second) on the stream margin or in side channels (Sheppard and Johnson 1985).

Reproduction

Age at first reproduction depends upon time spent in fresh water (1–3 years) and salt water (1–4 years). In southern and south-central California, steelhead move upstream to spawn during the declining flows of winter storms, which usually occur between January and March (Shapovalov and Taft 1954, Titus 1992), though adults have been identified in Malibu Creek as migrating from December through March (National Marine Fisheries Service 1997). Steelhead, mostly female, may spawn twice, but rarely more than that (National Marine Fisheries Service 1996). Peak spawning typically occurs from February through March (National Marine Fisheries Service 1997).

The female constructs a redd (i.e., nest) by fanning course gravel with her tail. Spawning gravel usually occurs at the tail of a pool or in a riffle. One or more males will join the female on the redd. The female can lay 200–12,000 eggs, depending on her size. The embryos settle into the spaces of the gravel where they remain buried for up to 4 weeks before hatching. The newly hatched larvae (i.e., *alevins*) remain in the nest for another 2–3 weeks (Moyle 2002).

Survival

Lethal water temperatures for steelhead are around 23–24 º C. Juvenile steelhead, when faced with higher temperatures, counter the increased cost of energetics resulting from higher temperatures by moving into fast riffles to feed. The energy expended for feeding is usually lower in riffles (Moyle 2002). Steelhead may also survive higher temperatures like rainbow trout by moving to colder temperature water at the bottom of pools. Bottom temperatures in the pools studied in Sespe Creek (Matthews and Berg 1997), were found to be on the average 5.4 to 8.6 degrees C cooler, which was related to the pool depth, inflow, and possible seeps. Although oxygen levels were found to be lower in the cooler waters, rainbow trout were found to be distributed closer to the lower water temperature, which contributed to the fish's survival.

Dispersal

Steelhead migrate downstream as they rear, eventually moving to the ocean to rear to maturity. Once they reach sexual maturity, they migrate into their natal stream to spawn.

Migration

Steelhead in southern California are winter-run. Adult winter-run steelhead enter streams following large rain events or the breaching of a lagoon by high stream flow or erosion by ocean storm waves. Adult steelhead move upstream between December and March, with peak movement typically in January and February. They move downstream after spawning, resting in large pools as they continue to migrate to the ocean.

Juvenile steelhead may either pass through the estuary/lagoon to the ocean or remain in the estuary/ lagoon system to feed on the abundant food sources. The amount and richness of food sources in estuaries/lagoons are often dependent upon freshwater inflow and timing of sand bar formation and breaching. Juvenile fish that remain in these systems are larger in size, which increases their chances of survival in the ocean.

Juvenile steelhead rear in freshwater for 1-3 years before beginning to migrate downstream. As they near the ocean, they undergo smoltification, a physiological process that allows young steelhead to survive in salt water. Most downstream migration occurs from fall to spring (Moyle 2002, National Marine Fisheries Service 1997).

Daily/Seasonal Activity

Adult steelhead move upstream December through March, with peak movement in January and February. Juveniles migrate downstream from late fall into early spring.

Diet and Foraging

While in streams, steelhead are opportunistic feeders and vary their diet based on seasonal availability of food items. In the summer months, they feed primarily on drifting aquatic invertebrates, terrestrial insects, and active bottom invertebrates. Individual fish will not, however, usually feed on the full range of available food. Larger fish tend to eat larger prey. Feeding can occur any time of day, but most activity occurs around dusk (Moyle 2002).

Once they migrate to the ocean, steelhead feed on estuarine invertebrates and krill. As they grow, other fish gradually become more important components of the diet. Steelhead's large size and rapid growth in the ocean can be attributed to a diet of fish, squid, and crustaceans. Adult steelhead in streams feed opportunistically, but it is not uncommon for them to stop eating for periods of time (Moyle 2002).

Territoriality/Home Range

Steelhead occupy the freshwater system from the estuary to stream headwaters, depending on access, water temperature, and perennial flow. The distance that southern steelhead move in the ocean is unknown.

Predator-Prey Relations

Juvenile and adult steelhead in fresh water feed on aquatic and terrestrial insects, invertebrates, and smaller fish. They are, however, prey to many other species, including bullfrogs, birds and predatory fish. Sculpin prey on steelhead eggs, alevin, and fry. Pikeminnow, sunfish species, and brown trout prey on juvenile and adult steelhead. Herons, kingfishers, and other predatory bird species feed on juvenile and adult steelhead when they occur in areas with low amounts of cover (Moyle 2002). In the ocean, steelhead are prey for larger marine life, such as sharks, sea lions, and seals.

Inter- and Intraspecific Interactions

The aggressive displays exhibited by steelhead when defending feeding territories include rigid swimming, flared gill covers, and nipping the caudal peduncle of invading fish. Fish size typically determines dominance of habitat areas, but environmental conditions, including depth and cover, affect territory size and occupancy. A single fish may defend several feeding territories, particularly against other steelhead. The number of territories an individual will defend is based on fish size, water velocity, water temperature, and amount of cover. Larger fish may have larger territories in which smaller fish are tolerated.

Steelhead often occur with other salmonids, as well as with sculpin, suckers, speckled dace, California roach, and pikeminnow. However, when steelhead are common, it is rare to find more than three or four other species in abundance. Because steelhead are flexible and adaptable in their behavior, they rarely compete with non-salmonids, but often dominate other salmonids (Moyle 2002).

Population and/or Habitat Status and Trends

West coast steelhead populations occur in 15 ESUs; these are differentiated on the basis of natural geographic boundaries that foster genetic isolation (National Marine Fisheries Service 1997). Each population in each ESU is treated as a distinct species by the National Marine Fisheries Service in determining the need for listing under the federal Endangered Species Act.

On National Forest System Lands

Population status of steelhead trout on National Forest System lands is generally unknown. There have been both limited surveys and an extended period of time between surveys. In 1999 through 2000, the Los Padres National Forest conducted snorkel surveys on selected streams. There was a fairly even distribution of *O. mykiss* recorded for streams with water (Tar Creek of the Lower Sespe and La Brea did not have water) (Los Padres National Forest unpublished stream survey data). The average number

of fish observed, standardized to a 100-m reach, was 23.7 individuals/100-m in 1999 and 41.6 individuals/100-m in 2000. Within the Southern California ESU, the highest densities of fish (> 50 fish/100-m) were observed in Manzana Creek of the Sisquoc watershed and Santa Paula Creek of the Santa Clara watershed. In the South-Central California Coast ESU, snorkel surveys of 1999-2000 noted high densities (> 50 fish/100-m) on Willow Creek and Plaskett Creek in the Monterey Coast. High densities were also found in Piney Creek and Santa Lucia Creek of the Arroyo Seco watershed.

Of the 13 reaches that were surveyed both years, there was not a significant increase in fish numbers for each site nor was there a significant difference across the forest between the two years indicating that large pulses of recruitment or migration did not occur in the winter of 1999. There was a difference in the production of small fish (< 40 mm) between the nine watersheds, with the Arroyo Seco and Sisar watersheds having much higher numbers of fry observed.

Beyond National Forest System Lands

Population status of steelhead trout off National Forest System lands is not fully known, although there have been surveys conducted in the recent past by a suite of agencies and entities (results are still pending). The factors for decline of steelhead populations in the Southern California ESU (Santa Maria River, California to southern extent of species range) include: water diversion and extraction, habitat blockages, urbanization, agriculture, and harvest (National Marine Fisheries Service 1996). The factors for decline of steelhead populations in the South-Central California ESU (Pajaro River, California to north of the Santa Maria River, California) include**:** urbanization, water diversion and extraction, historic flooding, habitat blockages, agriculture, poaching, and harvest (National Marine Fisheries Service 1996).

Threats and Conservation Considerations

The extensive decline of steelhead in central and southern California is due primarily to instream water management facilities that have resulted in inadequate flow, flow fluctuation, water diversion and extraction, blockage of passage, and desiccation of portions of rivers and streams (National Marine Fisheries Service 1997). Suitable spawning and rearing habitat on National Forest System lands are frequently located in upper-elevation areas above currently impassable barriers (i.e., dams) especially in the Santa Ynez and Ventura Rivers where these streams offer primary hopes for recovery of the populations and the Southern California ESU (McEwan and Jackson 1996 and U.S. Army Corps of Engineers 2004). The California Department of Fish and Game Steelhead Restoration and Management Plan of California identifies Bradbury Dam, on the Santa Ynez River, as a limiting factor for steelhead and that "nearly all historic spawning and rearing habitat is located upstream."

Efforts are ongoing to develop a strategy for restoring steelhead populations along the central coast of the Los Padres National Forest and on San Mateo Creek on the Cleveland National Forest. Currently, there are efforts underway by both forests to maintain and restore steelhead habitat on National Forest System lands including actions such as; invasive nonnative species eradication, riparian vegetation

restoration, abandoned mine land restoration, removing or mitigating recreation use impacts, and planning fuel treatment projects (prescribe burns) in steelhead watersheds, to list a few. The lists below describe some of the Forest Service conservation efforts aimed at recovering the species that have been completed since 2002:

Los Padres National Forest:

Restoration Projects: Continuous work removing the invasive nonnative tamarisk tree in Sespe Creek and in the Sisquoc River. In addition, active program for removing invasive nonnative fish, crayfish and bullfrogs from isolated pools in Sespe Creek. Continued non-use of Sisquoc grazing allotment. Burned Area Emergency Rehabilitation (BAER) work completed after a variety of wildfires such as: the Wolf fire (Sespe Creek), Piru fire (many road improvements in the Sespe Creek watershed and other tributaries to the Santa Clara River), Gaviota fire (face drainages located in the west Santa Barbara watershed), and a number of smaller wildfires. Closure and removal of Lion and Beaver Campground along Sespe Creek. Clean up of Cherry Creek shooting area on upper Sespe drainage. Maintenance and improvements on the Santa Paula Creek and Sisar Creek road crossings have also occurred over the years.

Interpretation and Environmental Education: Developed interpretive signs for steelhead trout, in English and Spanish, and a sign for riparian areas for use at campgrounds, day-use areas, and trailheads. Developed a steelhead brochure. Participated in numerous environmental education events; from Creek Clean-up Days to in-class programs promoting stewardship of watersheds and streams. Participated in the Ventura County Fair since 2002 to explain our management of imperiled species to fair-goers. Annually present programs to fire fighting personnel regarding threatened and endangered species protection and fire suppression tactics that minimize impacts to steelhead and watercourses.

Inventory: Conducted stream habitat, fish and macroinvertebrate surveys in numerous steelhead streams.

- Benthic aquatic macroinvertebrate sampling on 20 anadromous drainages for biotic stream condition analyses in 2004 (using RivPacs and IBI).
- Benthic aquatic macroinvertebrate sampling in 2004 below and above dams for comparisons of biotic stream condition.
- Analyses of 1999-2001 benthic aquatic macroinvertebrate assemblages for stream condition bioassays.
- Stream Condition Index (SCI) sampling post-fire (Sespe, 2002).
- Water quality and habitat quality samples taken on North Fork La Brea, Sisquoc, Manzana, and Upper Sespe in 2002.

Cleveland National Forest:

Restoration Projects: Continuous work removing the invasive nonnative animal species along 2 miles of upper San Mateo Creek over the past 5 years, based on opportunities identified in the Southern

Steelhead Assessment San Mateo Creek and Tributaries (Winter and Thomas 2002). Tamarisk removal projects throughout the watershed have also been ongoing for several years. In addition, California Department of Fish and Game has conducted occasional nonnative species eradication work in other parts of the creek, mostly at the Camp Pendleton/Forest boundary.

Previous actions: San Mateo Wilderness – established 1984 - protects most of the watershed that is on National Forest System lands. When the San Mateo Wilderness was established, all of the roads in the wilderness were abandoned but none were decommissioned. After wildfires, the Forest has been rehabilitating roads and re-sloping them so that only foot trails remain. This helps to reduce erosion. So far at least 4 miles of former roads have been done after the 1993 Ortega Fire.

Interpretation: Currently some interpretive signing through partnership with fishing and conserative group is being developed.

Inventory: As of last year the Forest completed surveys of San Mateo Creek for all threatened and endangered species, which will facilitate future analysis and planning of activities for this area.

Conservation and fishing groups, California Department of Fish and Game, and other federal agencies have all been very cooperative in working together to restore and improve steelhead habitat throughout southern California. Because of their wide, historic distribution throughout southern California, all four Forests have a role in the recovery of steelhead trout. There is currently a coordinated effort throughout the western United States to identify all access barriers to steelhead and prioritize them for replacement or removal.

The following is a list of conservation practices that should be considered for steelhead trout:

- When planning management actions within or near stream courses, lakes, reservoirs, meadows or vernal pools; riparian area protection through the designation of Riparian Conservation Areas (RCAs) will be based on methods described in the Five-Step Project Screening Process for Riparian Areas. Develop a Forest Service Handbook to describe tactics for management within RCAs,
- Utilize the stream protection forest plan standards developed from the guidance found in PACFISH when determining riparian protections (U.S. Forest Service and Bureau of Land Management 1995),
- Utilize Adaptive Mitigation Protocol for Recreation Uses to identify management activities (recreational or others) that cause riparian and/or habitat degradation in occupied streams and pursue options to avoid or minimize the effects of those activities (management actions could include signing, interpretation, increased Forest Service presence in the area, or the more extreme protection of an area closure, as necessary),
- Ensure adequate instream flows are secured and maintained during hydroelectric power project relicensing and/or authorization or reauthorization of channel/flow altering special use permits,
- Continue ongoing efforts to identify Forest Service road/steelhead passage barriers and analyze

and prioritize for removal as warranted,
- Harden or improve vehicular access points to minimize sediment delivery to the stream and reduce habitat disturbance,
- Los Padres National Forest should continue to work closely with other federal and state agencies during the Matilija Dam removal planning efforts in the Ventura River watershed,
- Los Padres National Forest should pursue options to provide for steelhead passage at Wheeler Gorge Campground,
- Cleveland National Forest should complete restoration activities identified in the Southern Steelhead Assessment for San Mateo Creek and Tributaries (Winter and Thomas 2002),
- Conduct prescribed burn projects in the contributing watersheds to minimize the occurrence of stand replacing (either trees or chaparral) wildland fires that could cause habitat degradation,
- Work cooperatively with other agencies (NOAA Fisheries, California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, etc.) to conduct species and habitat surveys. Share information to continuously improve knowledge about known locations,
- Work closely with species expert groups and universities to stay current on emerging scientific information regarding this species, especially regarding the genetic purity situation surrounding federally listed stocks of steelhead and hatchery reared rainbow trout,
- Work closely with California Department of Fish and Game to reduce or eliminate any new introductions of invasive nonnative fish species (through their management and/or through inadvertent introductions from private lands (as an example in San Mateo Creek watershed),
- Identify stream segments that have invasive nonnative species (bullfrogs, warm-water fish, nonnative salmonids, arundo, tamarisk, etc.) conflicts and conduct eradication efforts in these high priority areas,
- Work collectively with local communities to identify and restore interconnectedness of National Forest System land watersheds and habitats with downstream river systems beyond the forest boundaries. Some of these ongoing efforts include work to remove passage barriers along the Los Angeles and San Gabriel Rivers, which could eventually lead to species access to habitat within the San Gabriel Mountains. Extensive work is still needed on the Santa Ana River, which provided historic access to the San Bernardino and San Jacinto mountain ranges, and on San Juan and Trabuco Creeks, which provided historic access to the Santa Ana mountains,
- Continue to develop interpretive products to explain the population declines of steelhead trout and the many native fishes in California and those found on National Forest System lands,
- Work closely with California Department of Fish and Game to restrict suction dredging in high priority stream reaches,
- Continue to use protective measures during wildfires as developed by Forest Service and NOAA fisheries (National Marine Fisheries Service 2002b).

Evaluation of Current Situation and Threats on National Forest System Lands

Identify and prioritize restoration opportunities and seek funding to complete the restoration within the planning cycle.

Steelhead trout occur in coastal streams that have unobstructed fish-passage access to National Forest

System lands on the Los Padres National Forest and on the Cleveland National Forest. Some of the watersheds accessible to steelhead within the Los Padres National Forest boundaries are relatively undisturbed (National Marine Fisheries Service 2002a). The primary risks to steelhead trout are associated with water management, roads and trails management in the form of fish passage barriers at stream crossings or sediment contribution from roads or trails, visitor management in the form of intensive recreation use in riparian areas or within the stream channel, potential over-utilization of riparian areas by livestock, and invasive nonnative species (fish, bullfrogs, etc.) competing with or preying on steelhead trout.

Based upon the above analysis this species has been assigned the following threat category:

5. Disjunct in the Plan area with substantial threats to persistence or distribution from Forest Service activities.

Viability outcome for National Forest System Lands

Predicted Outcomes by Alternative

	1	**2**	**3**	**4**	**4a**	**5**	**6**
Threatened	D	D	D	D	D	D	D
Endangered	E	E	E	E	E	E	E

Southern California and South-Central ESU steelhead trout occur in Pacific coast coldwater streams. Although steelhead are found in some coastal streams on the Los Padres National Forest and the Cleveland National Forest, this species has disappeared from many streams in southern California due to dams, channelization and de-watering. Suitable habitat is highly isolated. The primary threats to this species are water diversion and flow management affecting water quantity and habitat quality, and concentrated recreational use (dam building) affecting stream channel bottoms and disturbing the species during the breeding season. Perennial streams, with year-round flows, will continue to receive heavy pressure from recreational use in all alternatives, as these are very desirable locations for day-use activities.

Generally speaking, streams and riparian areas will receive strong protection from management activities in all alternatives (see description of differences below). In addition, most of the watersheds supporting steelhead habitat on National Forest System lands have a moderate to large percentage of the total area within existing wilderness. Wilderness areas provide the highest amount of protection to species and habitat as a result of the inherent activity restrictions that accompany the congressional designation. Many of the steelhead streams are also currently designated as Wild and Scenic as well.

Alternatives 2-6 will provide stream and riparian area protection through a full set of forest plan standards and the use of the Five-Step Project Screening Process for Riparian Areas that delineates Riparian Conservation Areas for special management. Application of this process should minimize affects to aquatic species from Forest Service activities.

Under Alternative 1, current management -- which includes application of the PACFISH guidelines (USDA Forest Service and Bureau of Land Management 1995) for steelhead stream riparian area management, as well as the southern California forest's Interim Management Guidelines for Riparian Systems -- will continue to avoid aquatic environments and mitigate potential effects from proposed projects. There will continue to be slow and steady progress towards protecting and conserving this species.

Under Alternative 2, streams and riparian area management will be similar to that found in Alternative 1, but aquatic environments with at-risk species will receive added emphasis through the use of an adaptive management approach to meet riparian desired conditions. There will also be steady progress towards protecting and conserving this species, at a little faster pace than in Alternative 1, through the implementation of this alternative.

Alternative 3 is similar to Alternatives 1 and 2; with the key difference being that there will be an increased focus on improving habitat for at-risk species. Habitat restoration primarily relating to stream channel conditions, flow management and riparian vegetation health would receive focused attention. In addition, there is an emphasis on conservation and recovery of riparian dependent species, which would result in an improved outcome for the steelhead trout. Alternatives 3, 4, 4a, and 6 are likely to mitigate effects from existing uses at a faster pace than other alternatives, due to an emphasis on biodiversity. Alternatives 3 and 6 would relocate conflicting uses from riparian areas (e.g. possibly restricting use of segments of a stream during critical breeding periods) and make land acquisition for biodiversity a high priority (e.g. acquiring lands with streams adjacent to National Forest System lands to restore overall stream channel connectivity). Alternatives 3 and 6 will prioritize habitat enhancement projects through prescribed burning for certain species-at-risk; however total acreage would not be great due to emphasis on community protection.

Although Alternative 4 is similar to Alternative 2 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on accommodating recreation demand and maintaining sustainable recreation opportunities. The focus will be on maintaining and improving existing recreational areas and facilities, with a priority given to those areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. For the steelhead trout this would relate to the aquatic and riparian environments. Habitat restoration activities in Alternative 4 would primarily be accomplished at the prioritized developed recreation sites in association with environmental education and interpretation, hardening of the recreation sites, increased Forest Service presence, and restriction of unauthorized uses. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources.

This alternative will assist in the protection, conservation and recovery of this species while working to accommodate recreation demand.

Although Alternative 4a is similar to Alternative 4 in the use of an adaptive management approach for species habitat protection, there is a greater emphasis on only providing recreational uses that are compatible with the sustainability of the natural resources. Compared to the other alternatives, there is a higher level of focus on maintaining, improving, and expanding existing recreational areas and facilities before new facilities are constructed. Sustainable dispersed recreation use will also be the focus of this alternative. Priority is given to those riparian and aquatic areas where detrimental effects are occurring or could occur to species-at-risk or their habitat. Habitat restoration activity efforts will be made in Alternative 4a by using a variety of strategies. There will be an emphasis on land acquisition for biodiversity and maintaining and enhancing landscape linkages for wildlife movement. Forest visitors will have an increased understanding and appreciation of the local environment and an increased willingness to help maintain it. Alternative 4a includes a Critical Biological zone for steelhead trout on Sespe Creek. There will be a focus on forest health and the management for sustainable resource use in all land use zones. New recreation opportunities may be developed where they are determined to be sustainable and compatible with other resources. This alternative will assist in the protection, conservation and recovery of this species. The biggest difference between Alternative 4a and Alternative 4 is the designation of a greater acreage of land use zones that are managed for non-motorized uses.

Alternative 5 has an emphasis of increased motor vehicle-based recreation activities, commodity development, and accommodating community infrastructure such as water diversion and uses. This results in a more reactive approach to protecting species-at-risk, the possibility of higher risks to the species and habitat because of the effects of more overall development, motorized uses and extraction activities occurring concurrently, and a decreased emphasis on habitat improvement. Conservation objectives would be met at a slower rate in Alternative 5 compared to any other alternative. Alternative 5 would have a greater adverse effect on riparian areas because of the emphasis of providing for increased demand for motorized recreation and the amount of land allocated to motorized uses.

Alternative 6 is generally similar to Alternative 3 for aquatic and riparian dependent species, although moving towards the desired conditions for water and riparian areas and achieving protection and recovery of at-risk species would occur at a faster rate than under any other alternative. As described in Alternative 3, Alternative 6 would also relocate conflicting uses from riparian areas, prioritize land acquisition for biodiversity benefits, and put more of an emphasis on prescribed burning for species-at-risk habitat enhancement. Biodiversity is the primary emphasis of Alternative 6.

Grazing is basically the same for Alternatives 1-5, while Alternative 6 has 20 percent less grazed area than the other alternatives. New forest plan standards would be applied in Alternatives 2-6 to manage this authorized use. Existing standards would be utilized in Alternative 1.

Land use special designations (recommended wilderness, Wild and Scenic Rivers, etc.) would inherently

protect a portion of the land base and species from increased human use, disturbance and extractive demands due to less accessibility.

Alternative 6 has more recommended wilderness affecting steelhead habitat than other alternatives, and also affecting many stream segments upstream of dams on the Los Padres National Forest. Most alternatives contain existing Wild and Scenic River designations for the Big Sur and Sisquoc Rivers and Sespe, San Mateo and Devil Canyon Creeks. Alternatives 3 and 6 recommends Wild and Scenic River designation for the Little Sur River and Alternative 6 recommends the San Antonio River as well.

The Southern California (ESU) steelhead trout is listed under the Endangered Species Act of 1973, as amended, as endangered; and the South-Central California Coast (ESU) steelhead trout is listed as threatened; which assures that any new project proposed in or near its habitat will undergo considerable analysis and be subject to consultation with the NOAA Fisheries at the site-specific level. The Southern California (ESU) steelhead trout received a viability outcome rating of an "E" for all alternatives (on National Forest System lands) in recognition of the overall declining trend of populations in this ESU -- despite Forest Service management actions.

Viability outcome for all lands

Predicted Outcomes by Alternative

	1	**2**	**3**	**4**	**4a**	**5**	**6**
Threatened	D	D	D	D	D	D	D
Endangered	D	D	D	D	D	D	D

Steelhead trout occur in freshwater, low-gradient, low-elevation streams and Pacific Ocean salt water. Off-forest streams adjacent to National Forest System lands are in continuing decline, especially in urban areas where development brings an increased demand for water and increased diversion and stream channelization. Riparian and stream habitat on private land will continue to be impacted from the predicted rapid development. The primary threats to steelhead trout are from water diversions, flow regulations, barriers to upstream migration, and changes in water quality. Urban encroachment into riparian areas and stream channels is expected to continue as human populations increase dramatically over the next 15-20 years. In addition, anadromous species are also very vulnerable to changes in ocean conditions that can influence entire age classes.

The widespread occurrences of invasive nonnative aquatic plant species in many low elevation streams result in effects to the riparian vegetative structure through displacement of native vegetation and through consumption of large quantities of water, and pose an immediate threat to streams on National

Forest System lands. Invasive nonnative fish species result in effects to steelhead trout, as well as other native fishes, through predation and competition. These infestations will continue to have a detrimental effect on aquatic species and riparian habitat, as stream conditions are degraded.

National Forest System lands play an important role in protecting the existing populations of steelhead trout in southern California. However, because of the relatively consistent level of stream and riparian protection afforded by each of the Forest Plan alternatives, none of them compared to each other would serve to substantially change the outlook for the species, as many of the threats to these fish are outside of Forest Service control. Streams and riparian areas on the National Forests will serve an even more important role in southern California through time. Many of the remaining populations on private lands are at considerable risk of extirpation.

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Shay Creek Unarmored Threespine Stickleback **Tidewater Goby**