

# 1. Introduction

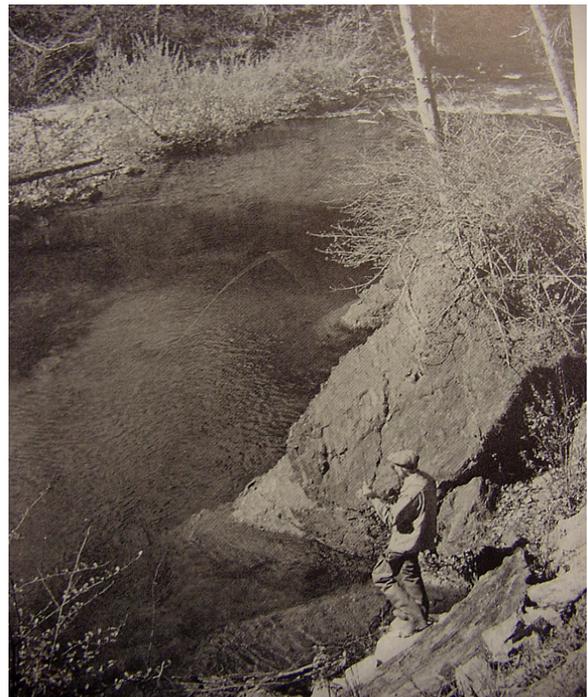
*“And so little rivers, granted sufficient rainfall to give them life, possess one thing in common. These sturdy migrants forge swiftly and surely over the tidal bars and up the current perhaps a dozen or two-score miles to the spawning bars at the headwaters far back in a deep dark canyon of the Coast Range. . . . Were I to conduct a visiting angler on a tour of these charming southern streams, I should like to first take him up to the Big Sur in the giant redwoods, where the rushing river comes downs through the forest from its birthplace far back in the mysterious shrouded canyons of the great Santa Lucia Range.”*

Claude M. Kreider. *Steelhead*.  
G.P. Putnam’s Sons, New York. 1948

## 1.1 South-Central California Coast Steelhead at Risk

Steelhead are the anadromous, or ocean-going, form of the species *Oncorhynchus mykiss*. Historically, these fish were the only abundant salmonid species that occurred naturally within the coast ranges of South-Central California (Jordan and Evermann 1896, 1923, Jordan and Gilbert 1881). Steelhead entered the rivers and streams draining the Coast Ranges from Point Santa Cruz to Point San Luis during the winter and spring, when storms produced sufficient runoff to breach the sandbars at the rivers’ mouths and provided fish passage to upstream spawning and rearing habitats. These fish and their progeny were sought out by recreational anglers during the winter, spring and summer fishing seasons (Alagona *et al.* 2012, Swift *et al.* 1993, Lufkin 1992, Nehlsen, *et al.*, 1991, Shapovalov *et al.* 1981, Capelli 1974, Boydston 1973, Fry 1973, 1938, Combs 1972, Puckett 1970, Shapovalov and Taft 1954, Kreider 1948, Hubbs 1946, Snyder 1913). The ethnographic and archaeological evidence regarding the role of *O. mykiss* in Native American culture is currently limited and subject to varying interpretation by investigators (Hosale 2010, Lightfoot and Parrish 2009, Glassow *et al.* 2007, Gobalet *et al.*,

2004, Hildebrandt 2004, Hudson and Blackburn 1982, Horne 1981, Swezey and Heizer 1977, Spanne 1975, Tainter 1975).



Steelhead Angler, Big Sur River, c. 1940s.

Following the dramatic rise in South-Central California’s human population after World War II and the associated land and water development within coastal drainages (particularly major dams and water diversions),

steelhead abundance rapidly declined, leading to the extirpation of populations in many watersheds and leaving only sporadic and remnant populations in the remaining, more highly modified watersheds such as the Salinas River and Arroyo Grande Creek watersheds (Boughton *et al.* 2005, Good *et al.* 2005, Helmbrecht and Boughton 2005, Busby *et al.* 1996). While the steelhead populations declined sharply, most coastal watersheds retained populations of the non-anadromous life history form of the species (commonly known as resident or rainbow trout), often in the upper reaches of watersheds within national forest lands that were more protected from the impacts of human development. In response to the dwindling native populations of anadromous and related non-anadromous resident *O. mykiss*, and in an effort to meet the burgeoning demand for recreational fishing opportunities, the California Department of Fish and Wildlife expanded an extensive put-and-take stocking program (Dill *et al.* 1997, Leitritz 1970, Butler and Borgeson 1965). This program was aimed principally at recreational anglers, and was not intended or expected to address the underlying causes of the decline of the anadromous runs in South-Central California. As conditions in South-Central California coastal rivers and stream continued to deteriorate, put-and-take trout stocking became more focused on suitable manmade reservoirs. Since the listing of the SCCCPS DPS as threatened in 1997, the California Department of Fish and Wildlife has ceased stocking hatchery reared fish in the anadromous waters of South-Central California (California Department of Fish and Wildlife and U.S. Fish and Wildlife Service 2010).

A substantial portion of the upper watersheds, which contain the majority of historical spawning and rearing habitats for anadromous *O. mykiss*, remain intact (though inaccessible to anadromous fish) and protected from intensive development as a result of their inclusion in the Los Padres National Forest (Blakley and Barnette 1985, Brown 1945). Additionally, a

significant amount of land within South-Central California coastal watersheds is protected by inclusion within State Parks and various military installations, including the upper Salinas watershed (such as portions of the Nacimiento and San Antonio Rivers) within the California Army National Guard Camp Roberts and the U.S Army's Fort Hunter Liggett.



Juvenile Steelhead, Carmel River, 1907.

NMFS's responsibility and goal is to prevent the extinction of steelhead in the wild and ensure the long-term persistence of self-sustaining wild populations of steelhead within the SCCCPS DPS by addressing those factors limiting the species' ability to survive and reproduce in the wild. The species can be removed from the list of federally-protected threatened and endangered species only after this goal has been reached.

Recovery of steelhead will require reducing threats to the long-term persistence of wild populations, maintaining multiple interconnected populations of steelhead across the diverse habitats of their native range, and preserving the diversity of steelhead life history strategies that allow the species to withstand natural environmental variability—both intra-annually and over the long-term.

An effective steelhead recovery program will require the implementation of a series of coordinated recovery actions that:

- ❑ Prevent steelhead extinction by protecting existing populations and their habitats.
- ❑ Maintain current distribution of steelhead and restore distribution to previously occupied areas that are essential for recovery.

- ❑ Increase abundance of steelhead to viable population levels, including the expression of all life history forms and strategies.
- ❑ Conserve existing genetic diversity and provide opportunities for natural interchange of genetic material between and within metapopulations.
- ❑ Maintain and restore suitable habitat conditions and characteristics for all life history stages so that viable populations can be sustained naturally.
- ❑ Refine and demonstrate attainment of recovery criteria through research and monitoring.

Preventing the extinction of steelhead has long term implications for all *O. mykiss* populations (Boughton *et al.* 2007b, Boughton and Goslin 2006). Steelhead have evolved an ability to search out and use a wide variety of ever-changing habitats over millennia. The loss of steelhead would initiate a process of irreversible cumulative extinctions of other native *O. mykiss* trout populations in the region because the evolutionary innovations that are the product of anadromy could no longer be spread among the remaining resident *O. mykiss* populations. Because of the naturally dynamic and unstable environment of South-Central California, the remaining resident *O. mykiss* populations would likely continue on the path of gradual differentiation and perhaps even speciation (Hoelzer *et al.* 2008), but with a vastly reduced ability to innovate and survive in a changing environment., thus increasing their chance of extirpation.

## 1.2 South-Central California Coast Steelhead Listing History

After NMFS completed a comprehensive status review of all West Coast steelhead populations (Busby *et al.* 1996), SCCCS populations were proposed for listing by NMFS as an threatened Evolutionarily Significant Unit (ESU) on August 9, 1996 (61 FR 41541). An ESU is composed of a group of conspecific populations that are substantially reproductively-isolated from other conspecific populations, and that possess important elements of the evolutionary legacy of the species which are expressed genetically and phenotypically that have adaptive value (56 FR 224, Waples 1998, 1995, 1991a, 1991b). The South-Central Coast Steelhead ESU was formally listed as threatened on August 18, 1997 (62 FR 43937). The original ESU boundaries during the first listing of 1997 were from the Pajaro River (at the border between Santa Cruz and Monterey Counties) south to (but not including) the Santa Maria River (southern San Luis Obispo County). During the time between the initial listing and a subsequent re-listing in 2006, NMFS adopted the DPS designation for steelhead to replace the ESU designation to be consistent with the listing policies and practices of the U. S. Fish and Wildlife Service. A DPS designation (61 FR 4722) uses similar but slightly different criteria from the ESU designation for determining when a group of organisms constitutes a DPS under the Endangered Species Act (ESA). A DPS is a population or group of populations that is discrete from other populations of the same taxon, and significant to its taxon. A group of organisms is discrete if it is “markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, and behavioral factors.” While a group of organisms is discrete if it is “markedly separated from other populations of the same taxon” it does not have to exhibit reproductive isolation under the DPS designation.

Following a subsequent status review of West Coast steelhead populations in 2005 (Good *et al.* 2005), a final listing determination for the threatened SCCCPS DPS was issued on January 5, 2006 (71 FR 834).

The final designation for the SCCCPS DPS encompasses all naturally spawned steelhead between the Pajaro River (at the border between Santa Cruz and Monterey Counties) south to (but not including) the Santa Maria River (at the border of San Luis Obispo and Santa Barbara Counties). Consequently, this DPS includes only those *O. mykiss* whose freshwater habitat occurs below impassible barriers, whether artificial or natural, and which exhibit an anadromous life history. Individuals originating in freshwater above impassible barriers and exhibit an anadromous life history are also considered as part of the DPS when they are within waters below the most downstream impassible barriers. All listed fish are protected under the “take” provisions of Section 9 of the ESA.

### 1.3 Designated Critical Habitat

The ESA requires NMFS to designate critical habitat for all listed species. Critical habitat is defined as specific areas where physical or biological features essential to the conservation (recovery) of the species exist and may require special management considerations or protection. For recovery planning and implementation purposes, these physical or biological features can be viewed as the set of habitat characteristics or conditions that are the end goal of many recovery actions.

When designating critical habitat, NMFS considers certain habitat features called “Primary Constituent Elements” (PCEs) that are essential to support one or more life history stage(s) of the listed species (50 CFR 424.12b). PCEs considered essential for the conservation of the SCCCPS DPS are those sites and habitat components supporting one or more life stages and containing physical or biological features essential to survival, growth, and reproduction.

These PCEs include:

- ❑ **Freshwater spawning sites** with sufficient water quantity and quality as well as adequate substrate (*i.e.*, spawning gravels of appropriate sizes) to support spawning, incubation and development.
- ❑ **Freshwater rearing sites** with sufficient water quantity and floodplain connectivity to form and maintain physical habitat conditions and allow development and mobility; sufficient water quality to support growth and development; food and nutrient resources such as terrestrial and aquatic invertebrates and forage fish; and natural cover such as shade, submerged and overhanging large wood, log jams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
- ❑ **Freshwater migration corridors** free of obstruction and excessive risk of predation with adequate water quantity to allow for juvenile and adult mobility; cover, shelter, and holding areas for juveniles and adults; and adequate water quality to allow for survival.
- ❑ **Estuarine areas** that provide uncontaminated water and substrates; food and nutrient sources to support growth and development; and connected shallow water areas and wetlands to conceal and shelter juveniles. Estuarine areas include coastal lagoons that are seasonally stable, predominantly freshwater-flooded habitats that remain disconnected from the marine environment except during high streamflow events, and tidally-influenced estuaries that provide a dynamic shallow water environment.

- ❑ **Marine areas** with sufficient water quality to support growth, development and mobility; food and nutrient resources such as marine invertebrates and forage fish; and nearshore marine habitats with adequate depth, cover and marine vegetation to provide shelter.

The final critical habitat designation for the SCCCS DPS was issued on September 2, 2005 (70 FR 52488). A total of 1,240 miles of stream habitat and three square miles of estuarine habitat were designated as critical habitat from the 28 watersheds within the range of this DPS. Critical habitat for the SCCCS DPS includes most, but not all, occupied habitat from the Pajaro River (at the border between Santa Cruz and Monterey Counties) south to (but not including) the Santa Maria River (at the border between San Luis Obispo and Santa Barbara Counties), but excludes some occupied habitat based on economic considerations and all military lands with occupied habitat. The stream channels with designated critical habitat are listed in 70 FR 52488. A review of the current critical habitat designations may result in modifications of the current critical habitat designations, including the addition of unoccupied habitat which exhibit PCEs.

## 1.4 The Recovery Planning Process

The ESA, as amended (16 U.S.C. 1531 *et seq.*), mandates that NMFS develop and implement recovery plans for the conservation of listed species. The SCCCS DPS was listed as threatened in 1997 under the ESA. The development and implementation of a Recovery Plan for the SCCCS DPS is considered vital to the continued persistence and recovery of steelhead in the South-Central California Coast.

NMFS has established a South-Central California Coast Steelhead Recovery Planning Area for the purposes of developing this Recovery Plan and guiding the implementation of actions to recover this species. The SCCCS

Recovery Planning Area extends from the Pajaro River (at the border between Santa Cruz and Monterey Counties) south to (but not including) the Santa Maria River (at the border between San Luis Obispo County and Santa Barbara Counties) and includes those portions of coastal watersheds that are at least seasonally accessible to steelhead entering from the ocean as well as the upstream portions of some watersheds that are currently inaccessible to steelhead due to man-made barriers. NMFS' West Coast Regional offices in Long Beach and Santa Barbara, California were responsible for the development of the recovery plan for the SCCCS DPS.

The Recovery Plan serves as a guideline for achieving recovery goals by describing the biological criteria that the listed species (and individual populations) must exhibit, and the recovery actions necessary to meet these criteria. Although recovery plans provide guidance, they are not regulatory documents. However, the ESA envisions recovery plans as the central organizing tool for guiding the recovery of listed species. Recovery plans also provide guidance to federal agencies fulfilling their obligations under Section 7(a)(1) of the ESA, which calls on all federal agencies to "utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species . . .". In addition to outlining proactive measures to achieve species recovery, recovery plans provide a context and framework for implementing other provisions of the ESA, including consultations on federal agency activities under Section 7(a)(2) and the development of Habitat Conservation Plans (HCPs) in accordance with Section 10(a)(1)(B).

Recovery plans are also intended to be used to inform local, state, tribal and non-governmental entities and individuals who may wish to participate in the conservation and recovery of the species, or who are engaged in activities that may adversely affect that species. Successful implementation of a recovery plan depends

upon the cooperation of stakeholders and planning and regulatory entities.

Pursuant to Section 4(f) of the ESA, a recovery plan must be developed and implemented for species listed as threatened or endangered, unless it is found that such a plan will not promote the conservation of the species. A recovery plan must include the following:

- ❑ Objective, measurable criteria, which, when met, will allow delisting of the species (see Chapter 6, Steelhead Recovery Goals, Objectives & Criteria);
- ❑ A description of site-specific management actions necessary for recovery (see Chapters 9 through 13, Biogeographic Population Groups; also Chapter 7, Steelhead Recovery Strategy, and Chapter 8, Summary of DPS-Wide Recovery Actions); and
- ❑ Estimates of the time and cost to carry out the recommended recovery measure (see Chapters 9 through 12, Biogeographic Population Groups, Recovery Action Tables; and Appendix E, Recovery Action Coast Estimates for Steelhead Recovery Planning).

Past recovery plans for other listed species have generally focused on the abundance, productivity, habitat, and other life history characteristics of a species. While knowledge of these characteristics is important for making sound conservation management decisions, the long-term sustainability of a threatened or endangered species can only be ensured by alleviating the threats that are contributing to the decline of that species or impeding its recovery. Therefore, the identification of such threats is a key component of any recovery program (National Marine Fisheries Service 2010b).

The Interim Endangered and Threatened Species Recovery Planning Guidance document (National Marine Fisheries Service 2010b) recommends “...using a threats assessment for species with multiple threats to help identify the relative importance of each threat to the species’ status, and, therefore, to prioritize recovery actions in a manner most likely to be effective for the species’ recovery.” This Recovery Plan uses this recommended approach to identify and prioritize threats to the SCCCS DPS. The prioritized threats are then used to guide the identification of specific recovery actions. Chapter 4, Current DPS-Level Threats Assessment, summarizes the threats across the DPS and Chapters 9 through 12 provide a summary of the threats assessments within each of the four BPGs of the DPS. The threats assessment method is discussed in Appendix D, South-Central California Coast Steelhead Recovery Planning Area Threats Assessment (CAP Workbooks) Methodology.

Finally, it should be emphasized that development of a recovery plan is the beginning of the recovery process. Implementation of recovery plans will require the development of site-specific and project specific information, and involvement of interested stake-holders to ensure that recovery actions are effective and sustainable.



Figure 1-1. South-Central California Coast Steelhead Recovery Planning Area.

### 1.4.1 South-Central/Southern California Coast Steelhead Technical Recovery Team

As part of its recovery planning efforts, NMFS assembled a team of scientists with a wide variety of expertise in biological and physical sciences to provide technical assistance to the recovery planning process for South-Central California Coast steelhead; this group is known as the Technical Recovery Team (TRT). NMFS' intent in establishing the TRT was to seek geographic and species-specific expertise to develop a scientific foundation for the recovery planning. The TRT produced and published a number of Technical Memoranda, which provide a description of the unimpaired historical populations within the Recovery Planning Area (Boughton *et al.* 2006), and identified viability criteria for anadromous *O. mykiss* in the SCCCPS DPS (Boughton *et al.* 2007b). Additionally, NMFS's Southwest Fisheries Science Center – Santa Cruz, produced and published a number of additional Technical Memoranda dealing with potential over-summering habitat in the region (Boughton and Goslin 2006), the reduction of the South-Central range limit of anadromous *O. mykiss* (Boughton *et al.* 2005), research and monitoring (Boughton 2010b), and recovery strategies in a changing environment (Boughton 2010a). Finally, NMFS's Southwest Fisheries Science Center undertook a number of genetic investigations in an attempt to identify the population structure of the SCCCPS DPS, and provided scientific review of local and regional recovery efforts (Clemento *et al.* 2009, Pearse and Garza 2008, Girman and Garza 2006; see also, Nielsen *et al.* 2001, 1994c).

### 1.4.2 Public Participation

Local, state, and federal support of recovery planning by those whose activities directly affect the listed species, and whose actions will be most affected by recovery requirements, is essential to the successful implementation of any recovery plan. NMFS supports and participates in collaborative efforts to develop and implement recovery plans by engaging local communities, state and federal entities, and other stakeholders.

As part of the recovery planning process, NMFS published a notice of intent to prepare a Recovery Plan for the species in the Federal Register and conducted a series of Recovery Planning Workshops to solicit information on threats and recovery actions as part of the development of the Recovery Plan for the SCCCPS DPS. Public workshops were held in Arroyo Grande and Carmel, California in April 2007 and in San Luis Obispo and Carmel, California in June 2007.

At these workshops, NMFS provided a general overview of the:

- federal recovery planning process;
- preliminary timeline for NMFS Recovery Plan development;
- current understanding of steelhead populations and their habitats;
- threats assessment process and the threats identified by NMFS; and

also received public input on potential recovery actions.

Following the overview, workshop participants were separated into smaller, facilitated breakout groups to identify threats to specific steelhead populations and their habitats. In the final set of workshops, breakout groups identified potential recovery actions for specific populations and habitats. Information obtained from these workshops was used in the initial development

of a formal threats assessment analysis using The Nature Conservancy's Conservation Action Planning (CAP) threats assessment method, and the identification of a full suite of recovery actions based on those threats. See Appendix D, South-Central California Coast Steelhead Recovery Planning Area Threats Assessment (CAP) Workbook Method.

NMFS has also established a web page to provide ongoing updates and information to the public about the recovery planning process, access to Recovery Plan materials and implementation of recovery actions. The web page for recovery planning and implementation for the SCCCS DPS (including the Recovery Plan, related NOAA Technical Memorandum, and Threats Assessment summaries) can be found at:

<http://www.westcoast.fisheries.noaa.gov/protected-species/salmon-steelhead/recovery-planning-and-implementation/south-central-southern-california-coast/south-central-southern-california-salmon-recovery-domain.html>

NMFS released a Public Review Draft of the South-Central California Steelhead Recovery in September 2012 and held public hearings at the end of October in San Luis Obispo, San Luis

Obispo County, and Monterey, Monterey County. NMFS also solicited written public comments until mid-December, and extended the comment period until June 2013 to allow the CDFW an additional opportunity to provide comments on the Recovery Plan.

Finally, recovery of the species cannot occur without public involvement in the implementation process. NMFS encourages the efforts of watershed groups dedicated to improving watershed ecosystem conditions. NMFS believes it is critically important to base steelhead recovery efforts on the many federal, state, regional, local, and private conservation efforts already underway throughout the region. Local support of the Recovery Plan by those whose activities directly affect the listed species, and whose actions will be most affected by recovery efforts, is essential. NMFS therefore supports and participates in locally-led collaborative efforts to develop projects and plans, involving local communities, state and federal entities, and other stakeholders. NMFS anticipates watershed groups and private entities will utilize the information and recommendations provided in this Recovery Plan to further refine and develop recovery actions to abate threats and meet recovery objectives.