Proposed Steelhead Recovery Goals, Objectives and Criteria

NOAA Fisheries Fish Survey Crew

NOAA Fisheries Technical Recovery Team

DPS Recovery Goals

Our goals are *to prevent the extinction of southern California steelhead and ensure the long-term persistence of viable, self-sustaining, interacting wild populations of steelhead distributed across the DPS.* To reach these goals, we must:

- Reduce threats to multiple populations throughout the DPS.
- Protect, restore, and maintain habitats of sufficient quality and natural complexity throughout the DPS.
- Allow the full range of all life-history forms of *O. mykiss* to use as many types of habitat as possible in order to overcome challenges of a highly variable natural environment.

DPS Recovery Objectives

- Prevent steelhead extinction by protecting existing populations and their habitats.
- Maintain current distribution of steelhead and restore distribution to previously occupied areas.
- 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 interchange of genetic material between and within viable populations.
- Maintain and restore suitable habitat conditions and characteristics to support all life history stages of viable populations.
- Conduct research and monitor populations in order to refine and fulfill recovery criteria.

Recovery Criteria

Prior to determining whether a species has "recovered" and can be removed from the List of Threatened and Endangered Species (*i.e.*, delisting) or have its protective status lowered from "endangered" to "threatened" (*i.e.*, down listing), certain criteria for recovery, related to the condition of the species and the status of the threats to the species, must be met. In the case of delisting the Southern California Steelhead DPS, biological recovery criteria regarding the abundance, productivity, spatial structure, and diversity of the populations within the DPS and the DPS as a whole are the measures of recovery. Threats abatement criteria are indicators that key threats to the populations and DPS have been abated or controlled. Both types of recovery criteria will be used by the National Marine Fisheries Service to assess whether the species is recovering (moving towards meeting the criteria), or has recovered completely (meets the criteria).

Biological Recovery Criteria

These criteria describe characteristics of both individual populations within the DPS and of the DPS as a whole that would indicate that the species has a low chance (< 5%) of extinction over a specific period of time. The recommended criteria address the preservation of the evolutionary potential of the species by assuring that the DPS will persist over a long enough period of time to exhibit evolutionary adaptations that allow the species to take advantage of varying environmental conditions.

Table 5-1. Biological Recovery Criteria (Ch.5 in Recovery Plan)

POPULATION-LEVEL CRITERIA – apply to certain populations in all of the Biogeographic Population Groups (BPGs)		
Criterion Type	**Recovery Threshold**	**Notes**
Mean Annual Run Size	Run size is sufficient to result in an extinction risk of <5% within 100 yrs	Monitoring run size will provide information on yearly population fluctuations, which will ultimately help determine the appropriate recovery threshold for individual populations. Research on the role of non-anadromous spawning fraction in stabilizing anadromous faction will also enable refinement of the minimum recovery threshold.
Ocean Conditions	Run Size criterion is met during poor ocean conditions	"Poor ocean conditions" determined empirically, or size criterion met for at least 6 decades
Spawner Density	Unknown at present	A potentially suitable threshold is the density at which intra-specific competition for redd sites becomes observable
Anadromous Fraction	N = 100% of Mean Annual Run Size	The average fraction of reproductive adults that are anadromous. The 100% figure is a precautionary rule since more research is needed to determine a viability threshold
DPS-LEVEL CRITERIA		
Criterion Type	**Recovery Threshold**	
Biogeographic Diversity	All BPGs must be restored to viability before the DPS as a whole can be considered recovered. 1. Biogeographic Population Group contains minimum number of viable populations: Monte Arido Highlands (4 populations); Conception Coast (3 populations); Mojave Rim (3 populations); Santa Monica Mountains (3 populations); Santa Catalina Gulf Coast (8 populations) 2. Viable populations inhabit watersheds with drought refugia 3. Viable populations separated from one another by at least 68 km or as widely dispersed as possible	
Life-History Diversity	Viable populations exhibit all three life-history types (fluvial-anadromous, lagoon-anadromous, freshwater resident)	

Threats Abatement Criteria

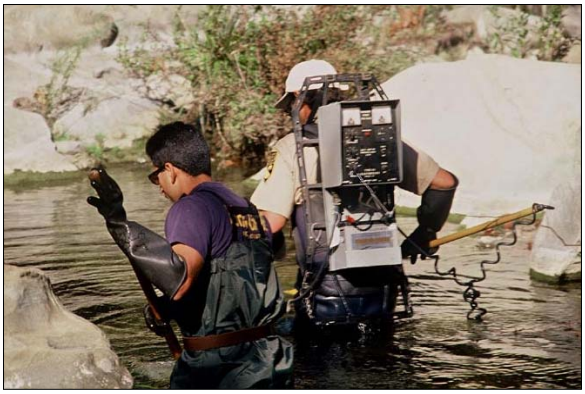
This plan prioritizes recovery actions for the watersheds within the BPGs according to the role of the watershed in recovery of the species and the severity of the threat addressed by the action.

- Priority 1—Actions that must be taken to prevent extinction or to prevent the species from declining irreversibly.
- Priority 2—Actions that must be taken to prevent a significant decline in species population/habitat quality or in some other significant negative impact short of extinction.
- Priority 3—All other actions necessary to provide for full recovery of the species.

Full tables listing each threat and its priority rating for each BPG can be found in the full Recovery Plan.

Proposed Steelhead Recovery Strategy

NOAA Fisheries Technical Recovery Team



Department of Fish and Game Fish Survey Crew

The recovery strategy is the approach undertaken to attain the individual recovery criteria and objectives and, in turn, the ultimate goal of delisting the Southern California Steelhead DPS. In forming a strategy for recovering the species, it is first necessary to identify populations within each watershed that are vital to the recovery of *O. mykiss* and the watershed-specific actions that address priority threats in these regions. Since the DPS extends over a large geographic area and consists of both public and private land, effective implementation of these recovery actions will require:

- Extensive education of the general public, non-governmental agencies, and local, regional, State, and Federal governmental agencies, on the role and value of the species within the larger watershed environment.
- Development of cooperative relationships with private land owners, special districts, and local governments that have direct control and responsibilities over non-federal land-use practices.
- Participation in the land use and water planning and regulatory processes of local, regional, State, and Federal agencies.
- Close cooperation with other state resource agencies such as the California Department of Fish and Game, California Coastal Commission, CalTrans, and the California Department of Parks and Recreation.
- Partnering with Federal resource agencies, including the U.S. Forest Service, U.S. Fish and Wildlife Service, National Park Service, U.S. Bureau of Reclamation, U.S. Bureau of Land Management, U.S. Army Corps of Engineers, U.S. Department of Transportation, U.S. Department of Defense, and the U.S. Environmental Protection Agency.

Core Populations

Watersheds that form the foundation for recovery of the Southern California Steelhead DPS exhibit favorable physical and hydrological characteristics that will most likely sustain independently viable populations, and are critical for ensuring viability of the DPS as a whole (*e.g.,* large spatial area, perennial and reliable winter streamflow, stream network extending inland). In turn, Core Populations are defined as those populations that are critical to the recovery of these foundational watersheds. The Recovery Plan organizes these populations into three tiers based on priority of recovery action:

Core 1 Populations

Populations identified as a high priority for recovery actions based on a variety of factors including: the intrinsic potential of the population in an unimpaired condition, the role of the population in meeting the spatial and/or redundancy viability criteria, the potential ecological or genetic diversity the watershed and population could provide to the species, the current conditions of the population and the severity of the threats facing the population, and the capacity of the watershed and population to respond to the critical recovery actions needed to abate those threats. Core 1 populations form the nucleus of the recovery strategy and must meet the population-level biological recovery criteria set out in the "Steelhead Recovery Goals, Objectives, and Criteria" section of the Recovery Plan.

Core 2 Populations

Populations that also form part of the recovery strategy by contributing to the set of populations necessary to achieve recovery criteria. Similar to Core 1 populations, Core 2 populations must eventually meet the biological recovery criteria; however, these populations are of secondary priority for recovery efforts.

Core 3 Populations

Complete attainment of DPS-level biological recovery criteria may also require recovery or stabilization of populations listed as Core 3. Dispersal connectivity between populations and genetic diversity may be enhanced by working to recover smaller Core 3 populations that serve as stepping stones for dispersal.

Critical Recovery Actions

Critical recovery actions address major threats to the endangered steelhead and should have the highest priority across the DPS and within watersheds to achieve recovery objectives and criteria. The National Marine Fisheries Service considers these actions to be the underpinnings for population recovery or for measuring recovery.

Although a wide range of anthropogenic activities have contributed to the high extinction risk of the Southern California Steelhead DPS, two broad types of developments and activities pose the principal threats to the species: (1) impassable barriers such as dams, and (2) water storage and withdrawal including groundwater extraction. Accordingly, the recovery strategy places a high priority on recovery actions that alleviate threats related to these activities. By addressing these critical threats, the Recovery Plan seeks to not only provide access to vital rearing habitats but also to ensure that the invaluable ecological functions of those habitats are protected and restored. Such functions include the promotion of genetic and ecological diversity by allowing for interbreeding between populations as well as buffers against natural and catastrophic anthropogenic disturbances (*e.g.*, wildfires, droughts, debris flows).

Regarding rearing habitats, fast juvenile growth is one the most effective strategies for successfully completing the early stages of the anadromous life-history, and ensuring survival during the ocean phase prior to return to freshwater as spawning adults. The identification, protection, and where necessary, restoration of such habitats is therefore another critical recovery action.

The critical recovery actions identified in the Recovery Plan do not diminish the importance of continuing to undertake other actions that directly promote the attainment and maintenance of essential habitat functions for individual populations within the Southern California Steelhead DPS. Resource managers and stakeholders should continue to implement recovery actions that: (1) curb unnatural inputs of fine sediments to waterways, (2) promote the establishment and maintenance of streamside vegetation and flood-plain connectivity and function, and (3) encourage the formation and preservation of complex instream habitat.

Critical Research for Recovery

An integral element in the Recovery Plan is the development of population abundance and core watershed research and monitoring programs which will help refine recovery criteria and objectives, as well as assess the effectiveness of recovery actions and the overall success of the Recovery Plan.

Research should focus on developing a better understanding of the following topics: (1) reliability of migration corridors; (2) productivity of freshwater tributary nursery areas; (3) role of seasonal lagoons, particularly for juvenile rearing; (4) productivity of freshwater mainstem habitats; (5) roles of intermittent freshwater habitats for both spawning and rearing; (6) spawner density as an indicator of individual population viability; (7) relationship between anadromous (steelhead) and non-anadromous (resident) forms, and population structure and viability; and (8) rates of dispersal between individual populations. In addition to these biological research topics, research on basic habitat dynamics should be conducted to provide additional direction in habitat protection and restoration. Such research includes the effects of the wildland fire regime and climate change effects on freshwater habitat; environmental factors that affect freshwater temperatures; and, factors producing freshwater refugia that sustain *O. mykiss* during seasonal or prolonged droughts.