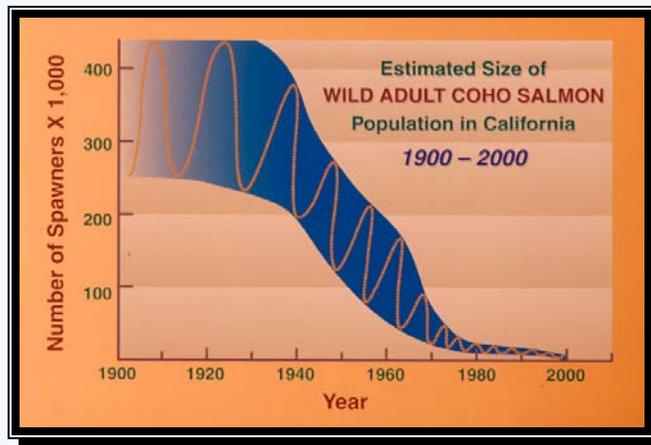


RECOVERY PLAN

FOR THE EVOLUTIONARILY SIGNIFICANT UNIT OF CENTRAL CALIFORNIA COAST COHO SALMON



*Photo Courtesy: CCC coho salmon, Morgan Bond, SWFSC
Conceptual Model of the Extinction Vortex for California's Coho Salmon, Peter Moyle 2009*

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LITERATURE CITATION SHOULD READ AS FOLLOWS:

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EXECUTIVE SUMMARY

CURRENT STATUS AND DISTRIBUTION: The known historical range of the Central California Coast (CCC) coho salmon Evolutionarily Significant Unit (ESU) extends from Punta Gorda in northern California south to Elkhorn Slough in Monterey County, California. The listed range extends from Punta Gorda south to the San Lorenzo River in Santa Cruz County, California. This species was listed as threatened with extinction on October 31, 1996 (61 FR 56138). Due to severe population declines its listing status was reclassified to endangered on June 28, 2005 (70 FR 37160). More recent studies are indicating a probable population collapse (McFarlane and Hayes 2008, in draft) across the species' range; increasing the likelihood of extinction. Only a few watersheds currently support more than remnant populations (e.g., Pudding Creek, Albion River, and Lagunitas Creek).

LIFE HISTORY AND HABITAT REQUIREMENTS: Coho salmon are anadromous fish and live in both the ocean and freshwater ecosystems where they exhibit distinctly different life stages (e.g., spawning, egg, alevin, summer rearing, winter rearing, smolt and ocean adult) with unique habitat requirements. Coho salmon spend approximately one year in freshwater and two years in the marine environment. They live approximately three years, and adults return to the streams where they were born, spawn, and then die after spawning. This species has a fairly rigid three year life history and fish of one year class rarely interbreed with fish from another year class. In the freshwater environment coho salmon require: (1) clean gravels for successful spawning and incubation; (2) adequate quantities of cool and well oxygenated water with complex deep pools for juvenile summer rearing; and (3) side-channels and alcoves and/or sufficient quantities of large woody debris for over-wintering habitat.

THREATS TO COHO SALMON: The factors adversely affecting this species are numerous and include both natural and human-made threats. Natural threats include disease, predation, droughts, and fluctuating ocean marine conditions. Human-made threats include habitat alterations such as water diversion, road building and maintenance, timber harvest, urbanization, flood control structures and practices and climate change. Generally, the greatest threats for coho salmon across the ESU come from three threat categories: (1) Roads and Railroads, and, particularly from the Russian River south, (2) Droughts, and (3) Residential and Commercial development. Logging and Wood Harvesting is a significant threat from the Russian River north. In certain watersheds, Channel Modification or Livestock Farming and Ranching posed significant threats to the species.

RECOVERY PLAN: When a species is listed as federally threatened or endangered under the Endangered Species Act (ESA), the listing agency must develop and implement a plan for the species' recovery. The final recovery plan was developed by the National Marine Fisheries Service (NMFS) Santa Rosa recovery team with assistance and input from scientists, co-managers, stakeholders, and others. The foundation of this recovery plan rests upon two NOAA Technical Memoranda prepared by a Technical Recovery Team (TRT) which was comprised of fishery scientists. The NOAA Memoranda described historical population structure and biological viability (Bjorkstedt *et al.* 2005, Spence *et al.* 2008) provided a rigorous scientific framework and numeric population viability goals and scenarios, which formed the basis for the recovery strategy.

The recovery team assessed current conditions and conducted a threats assessment for future threats for the freshwater and marine environments, including an analysis of the potential effects of climate change. Conditions and threats were assessed using The Nature Conservancy's Conservation Action Planning (CAP) protocol, one of several methods recommended in NMFS' (2007) Interim Recovery Planning Guidance for Threatened and Endangered Species. The recovery team endeavored to use the best available information to inform the assessments including information from California Department of Fish and Game habitat typing data, watershed assessments, public/private datasets, and many other sources of information and data.

RECOVERY STRATEGY: To focus recovery efforts and ensure proper prioritization, threat abatement and restoration and enhancement actions were developed for 28 of the 76 watersheds that historically maintained coho salmon. Within these 28 watersheds, subwatersheds were hierarchically prioritized. Subwatersheds with persisting populations were designated as Core areas. Protecting and restoring Core areas is essential for preventing the extinction of CCC coho salmon and Core areas are targeted for immediate threat abatement and enhancement and restoration actions. Areas outside of Core subwatersheds were designated Phase I or Phase II areas. Phase I areas are designated for necessary recovery actions to expand current populations. Phase II areas are designated for long-term recovery actions.

RECOVERY GOALS & OBJECTIVES: The overarching goal of this Recovery Plan is to prevent the extinction of wild CCC coho salmon and ensure their long term persistence in a viable, self sustaining, and eventually harvestable status across the ESU. Before NMFS considers downlisting or delisting CCC coho salmon, substantially higher numbers of returning adults and, successful spawning and rearing conditions in freshwater environments, are needed. To achieve these goals, it is critically important to preserve, enhance, and restore the species' existing habitats. Individual watersheds must have the capacity to support self-sustaining populations in the face of natural variation and conditions such as droughts, floods, variable ocean-rearing conditions, wildfires, and long-term climate change. Taken together, each watershed achieving a self-sustaining population contributes to a viable Diversity Stratum (groups of watersheds in ecologically similar environments), which in turn contributes to a viable ESU. NMFS has identified three objectives for the ultimate recovery of CCC coho salmon:

Objective 1: Prevent extinction by protecting habitats in Core Areas within identified focus populations. This will be accomplished by improving current conditions, and ameliorating existing and future threats;

Objective 2: Re-establish viable populations in the 28 prioritized watersheds (at a minimum) and within four of the five Diversity Strata by protecting, enhancing, and restoring habitats to properly functioning conditions, and by controlling and abating existing and future threats in all Core, Phase I and Phase II areas;

Objective 3: Implement standardized monitoring of coho salmon populations and their habitat across the CCC ESU. Standardization reduces uncertainty associated with habitat assessment methods and increases confidence in population estimates when evaluating effectiveness of recovery actions. Standardization will also improve accuracy when measuring progress towards downlisting and delisting criteria.

It is our hope that the information in this plan will facilitate further discussion on data resources and analysis, future threats and beneficial recovery actions, and will facilitate funding for high priority actions needed for CCC coho salmon. Working collaboratively with communities, organizations, and agencies to preserve our salmon heritage is our highest priority.

RECOVERY CRITERIA: Recovery criteria were developed to measure progress toward achieving recovery objectives. Recovery criteria measure progress toward achieving recovery objectives. Criteria must be “SMART”: specific, measurable, achievable, realistic and time-referenced. NMFS is proposing downlisting criteria for the transition between the endangered and threatened status, as well as delisting criteria, for the ESU. The specific criteria related to the status of populations, improvements in watershed conditions and the abatement of threats across the ESU must be met prior to downlisting or delisting. In addition, an analysis of threats pursuant to the five statutory listing factors in section 4 of the ESA will be necessary. Criteria are outlined in the following format in the recovery plan:

1. Downlisting and Delisting Recovery Criteria for Populations and ESU

- Population Level Criteria for Independent and Dependent Populations
- ESU Recovery Criteria for Delisting

2. Downlisting and Delisting Criteria for Watershed Health

3. Downlisting and Delisting Criteria for Threats (including an analysis of the listing factors)

Five Listing Factors

- Present or threatened destruction, modification, or curtailment of habitat or range
- Overutilization for commercial, recreational, scientific, or educational purposes
- Disease or predation
- Inadequacy of existing regulatory mechanisms
- Other natural and manmade factors affecting the species continued existence

A decision to delist a species must consider the biological performance of the populations (viability criteria), the threats that contributed to the species’ decline and listing under the ESA, and the future threats limiting their recovery.

RECOVERY ACTIONS: Recovery actions were developed for the ESU, Diversity Strata, and specific watersheds. The highest priority actions advocated to increase survival and improve the likelihood of recovery are:

- Finalize and implement the State Coastal Monitoring Plan. Implementation of the State Coastal Monitoring Plan (including development of an adaptive management and comprehensive database) is essential for evaluating the long-term viability of CCC coho salmon and their habitats as well as other species of listed salmonids in California;
- Focus restoration funds, notably the Pacific Coast Salmon Restoration Fund and California’s Fisheries Grant Restoration Program, to prioritize funding in Core areas and on activities that will increase the probability of freshwater survival;

- ❑ Promote restoration projects in over-wintering habitats such as alcoves, backchannels, off channel areas, and estuaries;
- ❑ Encourage appropriate agencies to secure funding for, and engage in, full enforcement of relevant laws, codes, regulations and ordinances protective of coho salmon and their habitats;
- ❑ Work with DFG to improve freshwater sport fishing regulations to minimize unintentional and unauthorized take, and incidental mortality, of CCC coho salmon by anglers during the CCC coho salmon migration period. This effort should include the development of appropriate low-flow closure thresholds (including consideration of emergency closure during adult migration beginning 2010), seasonal fishing closures, and angler outreach programs;
- ❑ Urge the California Board of Forestry to develop no-take rules and/or apply for a statewide Forestry Habitat Conservation Plan (HCP) and seek funding opportunities to support the effort;
- ❑ Assess and address the mechanisms driving forest conversions and provide incentives for sustainable forestry;
- ❑ Encourage forestry landowners to develop HCPs protective of coho salmon and their habitat;
- ❑ Improve coordination between the agencies, particularly the SWRCB, to effectively address seasons of diversion, off-stream reservoirs, and bypass flows fully protective of CCC coho salmon;
- ❑ Encourage counties to control forest conversions and prioritize development of rezoning and grading ordinances that are protective of CCC coho salmon and their habitats; and
- ❑ Finalize the Mendocino Redwood Company HCP.

ESTIMATED COSTS: Section 4(f) of the ESA requires recovery plans to include “estimates of the time required and the cost to carry out those measures needed to achieve the plan’s goal and to achieve intermediate steps toward that goal” (16 U.S.C. 1533(f)(1)(B)(iii)). NMFS estimates recovery for CCC coho salmon could take 50 to 100 years. The California Department of Fish and Game developed a State Coho Recovery Plan in 2004 and this Federal plan builds from the State Plan and contains many of the same recovery actions. The State of California conducted a comprehensive cost analysis for coho salmon recovery and estimated the total cost to achieve recovery for CCC coho salmon at between 3 billion dollars and 5 billion dollars (depending on Alternatives implemented) {DFG, 2004}. This estimate may under or over estimate the full cost of implementation, because not all costs could be quantified, and some costs may be incurred even without implementation of the plan. The State Coho Recovery Plan offered some recommendations that differ from those presented in this plan. The State Coho Recovery Plan presented costs in the simplest possible terms: the current cost of completing the action in 2004. It did not consider inflation or financing costs. Although there are differences between the State Coho Recovery Plan and the Federal CCC coho salmon recovery plan, NMFS will use the State cost estimates as they currently represent the best available information most relevant to the CCC coho salmon ESU. During the public comment period, we will further evaluate the cost analysis with assistance from the NMFS Science Center, NOAA Restoration Center and others including additional requests to the public for more precise cost estimates associated with restoration, monitoring and threat abatement.

Recovery of coho salmon will have significant costs, but will also provide economic benefits. Recovery actions undertaken for coho salmon will likely improve conditions for other listed salmon and steelhead, and also for a variety of aquatic and riparian species. Because of their direct and indirect economic value

as a resource for fishing, recreation and tourism related activities, each dollar spent on salmon recovery may generate significantly more dollars for local, state, Federal, and tribal economies. In other words, salmon recovery is best viewed not as a cost, but as an investment and opportunity to derive, diversify, and strengthen the economy.