Executive Summary

Coastal Multispecies Recovery Plan

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NOAA FISHERIES

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Cover Photo: Justin Smith, Sonoma County Water Agency, adult steelhead in the Russian River mainstem

COASTAL MULTISPECIES RECOVERY PLAN:

EXECUTIVE SUMMARY

The Coastal Multispecies Recovery Plan was developed for three salmon and steelhead species: the California Coastal (CC) Chinook salmon Evolutionarily Significant Unit (ESU), the Northern California (NC) steelhead Distinct Population Segment (DPS), and the Central California Coast (CCC) steelhead DPS. Between 1997 and 2000, NOAA Fisheries listed the CCC steelhead DPS (1997), the CC Chinook ESU (1999), and the NC steelhead DPS (2000) as threatened under the Federal Endangered Species Act (ESA) due to the precipitous and ongoing declines in their populations. Under the ESA, a recovery plan (which is a non-regulatory document) must be developed and implemented for each threatened or endangered species. The purpose of a recovery plan is to provide a framework for the conservation and survival of the listed species [ESA section 4(f)(1)] that focuses and prioritizes threat abatement and restoration actions necessary to recover, and eventually delist, a species.

The Coastal Multispecies Recovery Plan was developed for three salmon and steelhead species: California Coastal Chinook salmon, Northern California steelhead, and Central California Coast steelhead.

GEOGRAPHIC SETTING AND BIOLOGICAL FOUNDATION OF THIS RECOVERY PLAN

This recovery plan was developed by NOAA Fisheries' West Coast Region (WCR). It covers the geographic area of approximately 8 million acres along California's north and central coast that extends from the Redwood Creek watershed in Humboldt County, south to the Aptos Creek watershed in Santa Cruz County, including the San Francisco Bay Estuary and its tributaries (except for the Sacramento-San Joaquin rivers) and Humboldt Bay and its tributaries. The diverse geographic setting includes redwood and oak forestlands, rural working forests and agricultural lands, as well as the highly urbanized areas surrounding San Francisco Bay.

This plan covers the geographic area of approximately 8 million acres along California's central coast, extending from the Redwood Creek watershed in Humboldt County south to the Aptos Creek watershed in Santa Cruz County. It includes the San Francisco Bay estuary and its tributaries, and Humboldt Bay and its tributaries, but excludes the Sacramento and San Joaquin rivers.

The biological setting and foundation for the plan were provided in two technical memoranda prepared by a group of experts and fishery scientists (the Technical Recovery Team or TRT) led by the NOAA Fisheries' Southwest Fisheries Science Center. These memoranda describe each of the species' historical population structure and biological viability and also describe the environmental and biological settings necessary to reduce the risk of extinction. For each species, individual populations were classified as functionally independent, potentially independent or dependent populations, and the populations were grouped into Diversity Strata, which are geographically distinct areas with similar environmental conditions. Functionally independent populations are larger populations that are likely to persist over a 100-year time scale in isolation and without the influence of migrants from neighboring populations. Potentially independent populations are those likely to persist over a 100-year time scale but are influenced by immigration from neighboring populations; and dependent populations are those likely to go extinct within a 100-year time period in isolation and rely on immigration from neighboring populations to persist.

The TRT developed biological viability criteria for the three levels of biological organization (*i.e.*, populations, Diversity Strata, ESU/DPS), important for the long term persistence of salmon and steelhead. These criteria involve a minimum number of populations achieving viability and populations not required to achieve viability but that must demonstrate occupancy and distribution patterns to suggest sufficient connectivity within and between populations.

The TRT determined the CC Chinook salmon ESU was historically comprised of 38 populations (32 fall run and 6 spring run) distributed among four Diversity Strata. Of the 32 fall run populations, 15 were considered functionally or potentially independent, and the remaining were considered dependent populations. All six of the spring-run populations in the ESU were considered functionally independent, but all are now considered extinct. For the NC steelhead DPS, the TRT identified a total of 41 historically independent populations (19 functionally and 22 potentially independent) consisting of 31 winter run populations and 10 summer run populations (all summer run were functionally independent), and an unknown number of dependent populations. The NC steelhead DPS winter run populations were delineated among five Diversity Strata, and the summer run populations were split into two Diversity Strata. For the CCC steelhead DPS, the TRT identified a total of 38 independent winter run populations (12 functionally independent and 26 potentially independent) and 22 dependent populations distributed across five Diversity Strata.

> The TRT developed biological viability criteria for the three levels of biological organization (i.e., populations, Diversity Strata, ESU/DPS) important for the long-term persistence of the species. These criteria involve a minimum number of populations achieving viability, and populations not required to achieve viability demonstrating occupancy and distribution patterns to suggest sufficient connectivity within and between populations.

Not all populations are needed for, or capable of supporting, recovery in the ESU or DPS. The recovery team evaluated quantitative and qualitative information provided by a large suite of stakeholders regarding current presence or absence of Chinook salmon and steelhead, habitat suitability, threats likely affecting habitat suitability and current protective efforts ongoing in the watershed. Using this assessment, the recovery team selected populations from each species and Diversity Stratum that will be essential for their recovery; these are termed essential populations. The remaining populations are expected to play a supporting, although important, role in recovery; these are termed supporting populations. In nearly all cases, essential populations consist of independent populations expected to meet a low risk of extinction, while supporting populations are dependent populations and independent populations expected to meet a moderate risk

of extinction. Spawner abundance numeric targets were established for each essential and supporting population, for each Diversity Strata, and for the ESU and DPS.

Chinook salmon. Photo: U.S. Department of Fish and Wildlife

CHINOOK SALMON AND STEELHEAD LIFE CYCLE

Chinook salmon and steelhead are anadromous (ocean-going) fish and return from the ocean to the streams where they were born to spawn and die. This cycle of life takes them from freshwater to tidal zones to the ocean and back again in as few as three years. Each transition into a new habitat is associated with a different life stage. Salmon and steelhead begin as eggs in stream gravels where their parents spawned, they then emerge from the gravels and rear in the stream channel as juveniles where they will stay for a few months (some Chinook salmon) or a few years (steelhead) before beginning their downstream migration to the ocean as smolts. As adults, one to three years usually are spent in the ocean (depending on the species) before they return to their natal streams to spawn. Unlike Chinook salmon (and coho salmon), steelhead are iteroparous, meaning some adults do not die after spawning but instead return to the ocean and repeat the adult portion of their lifecycle one or more times.

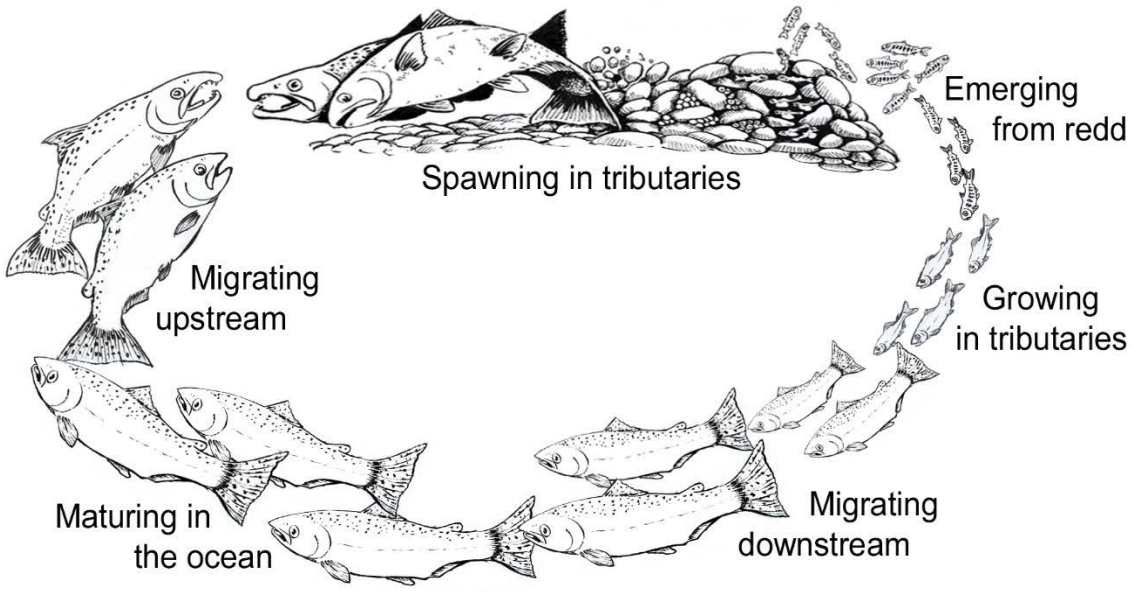

Figure 1: Salmon and steelhead lifecycle graphic. Illustrations by Blane Bellerud, NOAA Fisheries

Juvenile Chinook salmon and steelhead need cool, clean water that flows unimpaired and unconstrained from the headwaters to the ocean. The suitability of a river or stream to provide the necessary habitats for Chinook salmon or steelhead survival at each life stage is critical to their persistence. This means streams must have: (1) clean loose gravels free of fine sediment needed for spawning and egg development; (2) adequate pools and natural instream cover for juveniles; (3) connected alcoves and off-channel habitats for juveniles to survive winter flows; (4) clean cool water; and (5) unimpaired passage to and from the ocean. Coastal estuaries, or lagoons, play an equally important role in the life history of Chinook salmon and steelhead because they serve as transitional habitat between life in freshwater and marine environments. Properly functioning estuaries provide highly productive feeding opportunities where rapid growth occurs and where they can acclimate to saltwater prior to entering the ocean; this is particularly important during the smolt life stage for both species.

Chinook Salmon. Photo: California Department of Fish and Wildlife

ASSESSMENT AND PRIORITIZATION

The more impaired a watershed, the less likely juvenile Chinook salmon and steelhead will survive to reach the ocean and return as adults to spawn. The suitability of habitats to provide for salmon and steelhead survival across life stages, and ultimately abundant populations, is inexorably linked to factors that impair these habitats or diminish their ability to support these species (*e.g.*, threats). We evaluated numerous habitat conditions as well as natural and anthropogenic threats to their habitat and survival. Using two different analyses, the recovery team evaluated these conditions based on the best available information. The essential independent populations were analyzed using the Nature Conservancy Conservation Action Planning (CAP)[1] analysis. The

[1] CAP is an Excel-based user-defined tool with specific protocols to organize a project, assess conditions and threats, and identify strategies. The Excel CAP workbook warehouses all data for the project including assessment methods, results and references. It's an assessment method for threats recommended in the Interim Recovery Planning Guidance (NMFS 2010).

supporting dependent populations and supporting independent populations expected to achieve a moderate extinction risk were analyzed at the Diversity Stratum scale (not population level) using an abbreviated CAP protocol called the rapid assessment.

CURRENT STATUS

Low survival of juveniles in freshwater, combined with poor ocean conditions, led to the declines of Chinook salmon and steelhead throughout the central and northern California coastal areas.

Long time-series of adult return data are extremely scarce and for most populations only estimates based on best professional judgement are available. For steelhead, populations most impacted over the last 70 years are those surrounding San Francisco Bay.

Low survival of juvenile fish in freshwater, combined with poor ocean conditions, led to the declines of Chinook salmon and steelhead throughout the central and northern California coastal areas.

Based on our evaluation of current habitat conditions and ongoing and future threats, we conclude that all life stages of Chinook salmon and steelhead are impaired by degraded habitat conditions. These impairments are due to a lack of complexity and shelter formed by instream wood, high sediment loads, lack of refugia during winter, low summer flows, reduced quality and extent of coastal estuaries and lagoons, and reduced access to historic spawning and rearing habitat. The major sources of these impairments are roads, water diversions and impoundments, logging, residential and commercial development, severe weather patterns, and channel modification. Comparing results across the ESU and DPSs, patterns emerged. For CC Chinook salmon and NC steelhead, conditions and threats tend to worsen from south to north. This spatial difference is largely attributed to historic and current effects of intensive logging practices on the availability of instream large wood, reduced habitat complexity and shelter, and sediment generated from poor road construction throughout the northern coastal forests of Humboldt and Mendocino counties. For the CCC steelhead DPS, conditions are more degraded in the Santa Cruz Mountain and San Francisco Bay Diversity Stratum populations.

Monitoring juvenile salmonids. Photo: California Department of Fish and Wildlife

TURNING THE PLAN INTO ACTION

Threat abatement and restoration recommendations (recovery actions) were developed site-specifically and for the ESU/DPS, Diversity Stratum, and population (watershed). Actions described in the plan are prioritized as: (1) Priority 1 is an action that must be taken to prevent extinction or to identify those actions necessary to prevent extinction; (2) Priority 2 is an action that must be taken to prevent a significant decline in population numbers, habitat quality, or other significant negative impacts short of extinction; and (3) Priority 3 actions are all other actions necessary to provide for full recovery of the species.

Unlike many other recovery planning efforts in the western United States, few Federal or State lands are available to aid in the recovery of these species. The majority of lands in the recovery domain for this plan (approximately 83%) are in private ownership. The primary mechanism for Chinook salmon and steelhead protection on forestlands is California's Forest Practice Rules, while the primary mechanisms of protection from other land uses are more indirect and associated with State regulations, county ordinances, *etc*. Developing and nurturing partnerships with private landowners,

concerned citizens, various State and Federal agencies, and non-governmental organizations is essential. Furthermore, creating incentives and expanding public/private partnerships for restoration and improving land and water use practices are critical for the recovery of the CC Chinook salmon ESU and the NC and CCC steelhead DPSs.

To track progress towards recovery, we must develop and implement a comprehensive monitoring program that will provide the necessary data to inform species status and trends as well as the five federal listing factors and associated threats. For this, we will rely primarily on the California Coastal Monitoring Plan (CMP), which is a statewide program developed by the California Department of Fish and Wildlife (CDFW) and NOAA Fisheries to standardize monitoring of coastal populations of anadromous native salmonids and inform recovery, conservation, and management. Currently, CDFW and NOAA Fisheries are in the process of developing protocols for measuring habitat conditions in both freshwater and estuarine environments. Dedicated funding necessary to expand and refine the CMP will be critical.

THE PRICE TAG OF CLEAN WATER AND FLOWING STREAMS

Healthy salmon and steelhead populations provide significant economic benefits. Entire communities, businesses, jobs and even cultures have been built around the salmon and steelhead of California. Similarly, many communities, businesses and jobs have been lost as wild populations have steadily declined. In other words, unhealthy salmon and steelhead populations signify lost economic opportunities and an unhealthy environment. Investments in watershed restoration projects can promote the economy through the employment of workers, contractors, and consultants, and the expenditure of wages and restoration dollars for the purchase of goods and services. Such investments also provide opportunities for enhanced education and ways of connecting (or reconnecting) younger generations with nature. In addition, viable salmonid populations provide ongoing direct and indirect economic benefits as a resource for fishing, recreation, and tourist-related activities. Every dollar spent on salmon and steelhead recovery will promote local, State, Federal, and tribal economies, and should be viewed as an investment with both societal (*e.g.*, healthy ecosystems and clean rivers where we and our children can swim and play) and economic returns.

NOAA Fisheries estimates recovery of the CC Chinook salmon ESU and the NC and CCC steelhead DPSs would take 50 to 100 years. Although the cost for their recovery will be a significant amount of money, it is important to note the cost for recovery of each species will bring many ancillary benefits to the public as well as other species. Once implemented, many of the identified recovery actions described in this plan will also provide direct benefits towards the recovery of other salmon populations throughout coastal California and vice versa.[2] Therefore, costs of salmonid recovery will be shared among species within the recovery domain.

Monitoring salmonids. Photo: California Department of Fish and Wildlife

[2] In 2012 and 2014, the NMFS NCCO and NCO finalized the recovery plans for the Central California Coastal (CCC) coho salmon and Southern Oregon Northern California Coast (SONCC) coho salmon ESUs. Both of these ESUs overlap with CC Chinook and either the NC steelhead or CCC steelhead DPSs. This plan includes recovery actions at the three spatial scales that will ultimately benefit all salmonid species present within these populations and similarly, actions identified in the CCC and SONCC coho salmon plans will benefit CC Chinook and either NC or CCC steelhead populations.

RECOVERING SALMON

The plight of salmon and steelhead species is inexorably tied to the story of the changing landscape. Many naturalists, fishermen and biologists across Europe, Eastern Pacific and North America have monitored salmon and steelhead and chronicled their decline and extinctions. NOAA Fisheries alone cannot shift the trajectory of Chinook salmon and steelhead from their continued decline towards recovery. Their recovery will require a united community forming alliances and strategically implementing recovery actions to this single purpose. Salmon survival will depend on us not regarding "…*this inhabitant of the waters with something like annoyance"* (Fearing 1876), but embracing a paradigm that we can live, work and use the land and water compatibly with the needs of the larger ecological community, including fish.

> *"…restoring salmon runs will require reshaping our relationship to the landscape, guided by the humility to admit that we do not know how to manufacture, let alone manage, a natural ecosystem…"*
>
> *David Montgomery 2003*

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