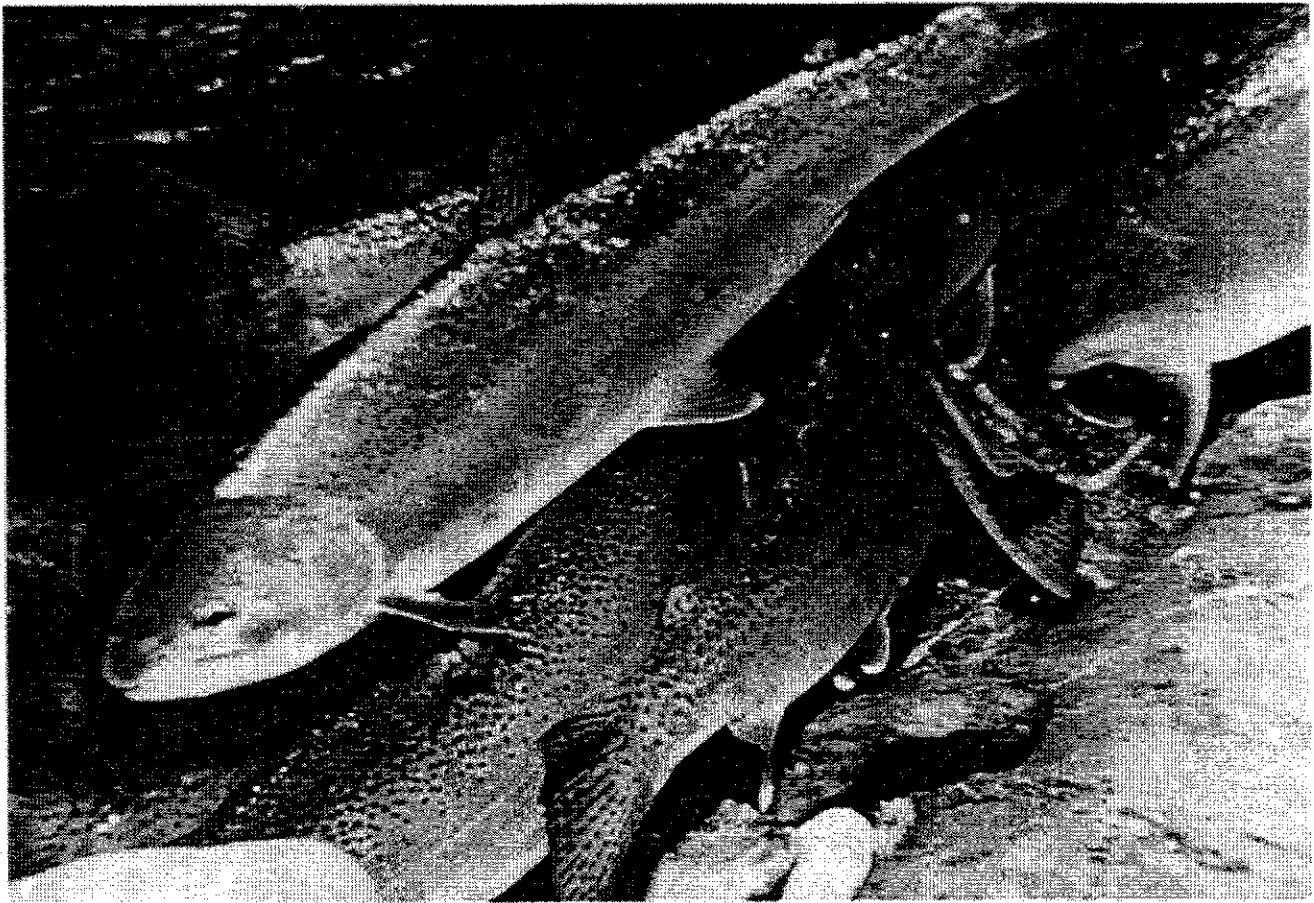

STEELHEAD RESTORATION AND MANAGEMENT PLAN FOR CALIFORNIA



Summer Steelhead by Daniel W. Gotshall



DEPARTMENT OF FISH AND GAME

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State of California
The Resources Agency
Department of Fish and Game

STEELHEAD RESTORATION AND MANAGEMENT PLAN FOR CALIFORNIA

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"...we must constantly keep in mind that variation, i.e., deviation from the norm is one of the most marked characteristics of animal life. And of the vertebrates, the trouts are among the most variable of all. Further, of the trouts the steelhead is one of the most variable forms."

Leo Shapovalov and Alan Taft, 1954

"...we do not imply that it is evil to enjoy lox, calamari, and caviar, for carnivory is not inherently immoral. It is only excess that is offensive to nature. And when we destroy the ability of species to survive and to maintain their ecological position, when we destroy their habitats and their capacity to evolve, that is excess."

Nelson and Soule, 1987

FOREWORD

On behalf of the California Department of Fish and Game, I am pleased to present our report, *Steelhead Restoration and Management Plan for California*. This document will serve as the blueprint for the Department's efforts to restore this prized, and oftentimes overlooked, resource.

Restoration of California's anadromous fish populations is mandated by *The Salmon, Steelhead Trout, and Anadromous Fisheries Program Act of 1988* (SB 2261) which states that it is a policy of the State to significantly increase the natural production of salmon and steelhead by the end of the century. SB 2261 directs the Department to develop a program that strives to double naturally spawning anadromous fish populations by the year 2000.

Steelhead management is often included in, and sometimes lost within, management of the more economically important Pacific salmon. Recognizing this, several legislators along with prominent angling organizations urged the Department to incorporate a Statewide Steelhead Restoration Plan into the initial elements of the SB 2261 program. Thus, the development of the *Steelhead Restoration and Management Plan for California* (Steelhead Plan) has been an important feature of the SB 2261 program since its inception in 1988. Various organizations, principally California Trout, Inc. and Trout Unlimited, remain committed to assisting the Department in its efforts to recover steelhead populations and eagerly await the publication of the Steelhead Plan so that implementation of the identified restoration measures can begin. Many other angling and conservation organizations are committed to the Steelhead Plan and have corresponded with the Department during its development.

Governor Pete Wilson pointed out in his *Water Policy Statement* of April, 1992, the urgent need for a long-term, comprehensive water policy that includes safe, reliable water supplies for cities and farms and sufficient water to restore fish and wildlife resources. The goals and recommendations set forth in the Steelhead Plan are consistent with this latter aspect of the Governor's Water Policy. Because steelhead are present within the range of all other anadromous salmonid species in California, and because they use a greater portion of a particular river system than do other anadromous fish, restoration of steelhead habitat will have a salutary effect on many other anadromous fish species as well.

The Steelhead Plan is one in a series of documents developed by the Department to address the mandated doubling policy stated above. *Restoring Central Valley Streams, A Plan for Action* was published in 1993 and presents a multi-species approach to restoration of anadromous fish populations in the Central Valley. The Steelhead Plan dovetails with, and is an

integral component of, this Action Plan. The Steelhead Plan identifies the life history requirements and needs of an important element of Central Valley anadromous fish ecosystems.

The need to quickly develop and implement a statewide steelhead restoration plan was heightened by the precipitous decline of California's naturally spawning steelhead populations. A rough estimate of the total statewide population is 250,000 adults, less than half the population of 30 years ago. The major factor causing the steelhead population decline, as identified in this document, is freshwater habitat loss and degradation.

The decline of naturally spawning steelhead stocks has prompted the National Marine Fisheries Service (NMFS) to undertake a status review to determine if they warrant listing under the Endangered Species Act (ESA). Implementation of the Steelhead Plan will hasten recovery and may prevent more drastic actions mandated by the Federal ESA. The *Central Valley Project Improvement Act* is another Federal law that addresses restoration of naturally spawning steelhead stocks. The Act establishes funds and water for fish and wildlife restoration in the Central Valley and directs the Secretary of Interior to develop and implement a program to double the natural production of anadromous fish in Central Valley rivers and streams.

This plan is not a single species, stand-alone document that ignores other native aquatic organisms and other portions of the ecosystem. It provides guidelines for steelhead restoration and management that can be integrated into current and future planning for specific river and stream systems. It identifies requirements specific to steelhead and is intended to augment current anadromous fish restoration plans. The Steelhead Plan recognizes that restoration of California's steelhead populations requires a broad approach that emphasizes ecosystem restoration.

As an example of how the plan can be factored into other planning processes, the Department, along with the Resources Agency and several other agencies and organizations, has recently embarked on the *Coastal Salmon Initiative*, an ambitious plan to protect and restore salmon and steelhead habitat along the coastal areas of northern California. The Steelhead Plan identifies what is needed for steelhead in this area, yet does not provide specifics on how to accomplish these needed measures. Elements of the Steelhead Plan can be easily included in the *Coastal Salmon Initiative*, which will provide the specifics on how these restoration measures for steelhead can be accomplished. Thus, the two plans, rather than being two stand-alone plans that attempt to address the same problems, are dependent on each other.

Implementation of actions specified in the Steelhead Plan will reverse the decline in steelhead populations. Restoring California's steelhead populations would provide the following benefits to California citizens:

- In 1991, there were an estimated 99,700 steelhead anglers in California, which is substantially less than that estimated in the early 1980s. This decline in angler numbers mirrors the decline in steelhead numbers. A benefit of the project will be improved angling opportunities for steelhead and increased participation in the sport.
- Doubling California's steelhead populations would result in an estimated 37.5 million dollars annually to the State's economy from sport fishing revenue.
- Steelhead are an important component of the State's diverse wildlife heritage. They are a good indicator of the health of the aquatic environment because they require clear, clean water, and they use all portions of a river system. As such, they provide an important benefit to the quality of life for all California citizens.

Severe population declines, potential listing under the ESA, fulfillment of legislative mandates, and our Public Trust obligations argue for early implementation of the Steelhead Plan. As always, the overall success of our efforts hinges upon the encouragement and participation of the citizens of this State. The Department welcomes all suggestions from, and the involvement of, anyone that shares our view of a healthy, sustainable future for fish and wildlife in California.

C. F. Raysbrook
Interim Director

February 1996

EXECUTIVE SUMMARY

Management Goals

Steelhead are an important and valued resource to California's citizens and are an important component of the vast biodiversity of the State. Like many of California's anadromous fish resources, steelhead are declining. Decline of steelhead populations is but one aspect of the present statewide decline in biodiversity, caused by California's burgeoning human population and the ever-increasing demand on natural resources.

This plan focuses on restoration of native and naturally produced (wild) stocks because these stocks have the greatest value for maintaining genetic and biological diversity.

Goals for steelhead restoration and management are 1) increase natural production, as mandated by *The Salmon, Steelhead Trout, and Anadromous Fisheries Program Act of 1988*, so that steelhead populations are self-sustaining and maintained in good condition and 2) enhance angling opportunities and non-consumptive uses.

Strategies to accomplish these goals are 1) restore degraded habitat 2) restore access to historic habitat that is presently blocked 3) review angling regulations to ensure that steelhead adults and juveniles are not over-harvested 4) maintain and improve hatchery runs, where appropriate and 5) develop and facilitate research to address deficiencies in information on fresh water and ocean life history, behavior, habitat requirements, and other aspects of steelhead biology.

Status

Rough estimates place the total statewide population at 250,000 adults, less than half the population of 30 years ago. The decline of California steelhead appears to be part of a more prevalent coastwide steelhead decline. This decline has prompted the National Marine Fisheries Service to undertake a status review to determine if steelhead warrant listing under the Endangered Species Act. The major factor causing the decline in California is freshwater habitat loss and degradation. This has resulted mainly from three factors: inadequate stream flows, blocked access to historic spawning and rearing areas due to dams, and human activities that discharge sediment and debris into watercourses.

The historic range of steelhead on the north coast (north of San Francisco Bay) has not been reduced as drastically as it has in other areas of the State. Consequently, this area has the greatest amount of remaining steelhead habitat in the State and the most abundant populations. The Klamath-Trinity river system supports the greatest number of steelhead in California. However, these stocks have declined from an estimated run size of 283,000 adults in the early 1960s to about 150,000 in the early 1980s. Steelhead runs in north coast drainages are comprised mostly of wild fish, although the percentage of wild fish appears to have decreased in recent years.

Adverse impacts to north coast stocks are mainly from land-use activities, primarily timber harvest and agriculture, and water diversion, gravel mining, and predation by recently introduced squawfish.

Steelhead ranged throughout the tributaries of the Sacramento and San Joaquin rivers prior to dam construction, water development, and watershed perturbations of the 19th and 20th centuries. Populations have been most severely affected by dams blocking access to the headwaters of all the major tributaries, consequently, most runs are maintained through artificial production. The average annual run size in the Sacramento River system above the mouth of the Feather River in the 1950's was estimated to be 20,540 fish. The annual run size for the total Sacramento River system in 1991-92 was probably less than 10,000 adult fish. The decline of Central Valley naturally produced steelhead has been more precipitous than that of the hatchery stocks: numbers of wild steelhead above Red Bluff Diversion Dam (RBDD) on the Sacramento River have decreased from an average annual run size of roughly 12,900 in the late 1960's to approximately 1,100 in 1993-94. Wild stocks are mostly confined to upper Sacramento River tributaries such as Deer, Mill, and Antelope creeks and the Yuba River.

Southern steelhead (those occurring south of San Francisco Bay) were formerly found in coastal drainages as far south as the Santo Domingo River in northern Baja California and were present in many streams and rivers of southern California. Today, Malibu Creek in Los Angeles County is the southern most stream containing a known spawning population. Southern steelhead are the most jeopardized of all of California's steelhead populations. Population numbers have declined drastically in nearly all streams where they exist, and runs have been extirpated from many others. Of 122 streams south of San Francisco Bay known to have contained a steelhead population, 47% had populations with reduced production from historical levels and 33% no longer supported populations. Major adverse impacts to southern steelhead are from urbanization and water impoundment and diversion.

Watershed Protection and Restoration

Land-use activities associated with logging, road construction, urban development, mining, livestock grazing, and recreation have reduced fish habitat quantity and quality by changing streambank and channel morphology, altering water temperatures, degrading water quality, and blocking access to spawning areas. DFG supports recent initiatives to restore and maintain anadromous fish habitat on Federal and private lands.

Stream Restoration

There are many streams in California where water has been over-appropriated. The recent drought has shown that there is little water to spare for instream uses in many areas of the State. DFG utilizes several provisions and laws to protect and maintain instream flows for the benefit of fish and wildlife, although protection of instream flows is frequently inadequate. The Klamath River below Iron Gate Dam, the Sacramento River below Shasta Dam, the American River below

Folsom Dam, the San Joaquin River below Friant Dam, and the Santa Ynez River below Bradbury Dam are a few examples of former and present steelhead waters where severe environmental problems have resulted because of insufficient releases from reservoirs. Although there have been several favorable court decisions affirming the protection of fish and wildlife under the Public Trust Doctrine, those resources held in trust in many areas of the State continue to decline. DFG needs a more effective means to identify, maintain, and achieve adequate flows for steelhead throughout their range.

Further protections from suction dredging impacts may be necessary for some steelhead populations. Stream bank alteration permits for gravel mining should include measures to insure that public trust values are protected.

Estuaries can be important rearing areas for juvenile steelhead, especially in small coastal tributaries. Mechanical breaching of sandbars to drain lagoons and estuaries can have detrimental effects on survival of juvenile steelhead. Methods to allow regulation of lagoon water levels which alleviate the need for breaching need to be developed and implemented.

Increased development and incompatible land uses can negate existing protections for steelhead habitat. Therefore, acquiring lands to protect critical stream reaches should be a high priority. Priority should be given to acquisition of riparian lands that have water rights, stream reaches to support depressed native stocks, and estuaries.

Natural and Artificial Production

Although many artificial propagation programs have succeeded in producing fish for harvest, they have generally not produced a sustained increase in the abundance of wild fish or fully mitigated for water development impacts. There is evidence that impacts to wild populations from hatchery supplementation may be contributing to their decline. Two main concerns regarding the effects of hatchery supplementation programs on wild steelhead genetics are loss of genetic diversity and reduction in fitness to the natural environment.

Under State policy, natural production is the foundation for steelhead management and restoration. Artificial production will be limited to areas where it already occurs, where it is necessary to prevent the extinction of a native run, or where the native population has already become extirpated and the habitat is irrevocably altered.

Existing hatchery and rearing programs will be operated to minimize impacts to natural stocks to the maximum extent possible. To provide a solid foundation to begin managing to protect natural stocks, DFG needs a reliable means to differentiate wild fish from hatchery fish. For this reason, all hatchery production will be marked prior to release. The Stock Management Policy will be strictly adhered to by all agents of the DFG.

Angling

In 1991, there were an estimated 99,700 steelhead anglers in California. It is estimated that sport fishing revenues could generate an additional 37.5 million dollars per year to the State's economy if California's steelhead populations are doubled.

Limited information on steelhead sport harvest rates suggests that over-exploitation of wild stocks is not occurring on a widespread basis and is not causing the general decline, therefore, a statewide selective harvest regulation or an annual bag limit is not warranted.

Management Objectives

North Coast

Management focus will be on maintaining and increasing population abundance, with principal emphasis on naturally produced stocks. Management efforts will be directed toward minimizing the impacts from watershed disturbances, preventing new disturbances, restoring instream habitat, and increasing summer steelhead populations.

Population monitoring and implementation of new angling regulations and habitat protection measures are recommended to prevent further declines of summer steelhead populations.

Greater releases from Iron Gate Dam on the Klamath River are needed. A long-term flow evaluation on the Trinity River will be completed in 1996 and may result in increased releases for fish and wildlife. Watershed and stream restoration activities in the South Fork Trinity River need to be accelerated.

Steelhead production in the Scott and Shasta rivers is constrained by severely degraded habitat conditions from timber harvest and agricultural practices. Improved flows for anadromous fish populations in these rivers are needed.

DFG is developing a restoration plan for salmon and steelhead in the Eel River which will identify specific actions needed for steelhead restoration in this system. DFG and other agencies are investigating the effectiveness of controlling introduced squawfish populations through techniques such as gill netting and seining, electrofishing, explosives, and chemical treatments.

Habitat for naturally spawning steelhead in the Russian River system is severely degraded. Instream flow requirements for salmon and steelhead need to be determined. When the cumulative impact analysis of existing and proposed diversions is completed, DFG should make the appropriate recommendations to the State Water Resources Control Board (SRWCB) so that necessary instream flows are provided.

Central Valley

Management focus for Central Valley steelhead is to recover native and wild populations and restore hatchery-maintained runs.

The Sacramento River below Keswick Dam is beset with many of the ecological problems associated with highly regulated rivers. This river yields 35% of California's water supply and provides for the largest portion of the State's sport and commercial salmon catch. These two incongruous functions lie at the heart of California's present water controversy. Identified restoration measures for the mainstem include correcting fish passage and fish screening problems at the Glenn Colusa Irrigation District Diversion, Red Bluff Diversion Dam, and small agricultural diversions; rerouting the Colusa Drain; and cleanup of Iron Mountain Mine.

Mill, Deer, and Antelope creeks have the best potential of all Central Valley streams for restoring wild steelhead populations. These streams are similar in that they have relatively pristine, well-protected upper reaches with ample spawning and rearing habitat, and they suffer from inadequate flows in the lower reaches. A solution to inadequate flows in Mill Creek is being implemented: ground water is being exchanged for surface flows, with funds provided to the diverter to pay power costs for pumping. A monitoring program funded by *Steelhead Catch Report-Restoration Card* revenues was recently implemented in Mill and Deer creeks to assess adult steelhead numbers.

The Yuba River supports the largest, naturally reproducing population of steelhead in the Central Valley. DFG has recommended temperature and flow regimes to the SWRCB to maintain and restore the anadromous fisheries. DFG will continue to manage the Yuba River as a wild steelhead fishery.

The steelhead population in the American River is almost entirely supported by Nimbus Hatchery. Over the past decade the run has declined significantly, probably due to adverse water temperature conditions, rapid flow fluctuations, inadequate water releases from Nimbus Dam, increased CVP and SWP water exports, and the 1986-92 drought. Measures to restore steelhead populations include: adoption of adequate minimum flows and flow fluctuation standards by the SWRCB; establishment of a minimum storage level for Folsom Reservoir; and correcting the water temperature problem at Nimbus Hatchery.

Natural production of steelhead in the Central Valley will continue to be limited due to inaccessibility of the headwaters. A hatchery program needs to be implemented if restoration of steelhead is to be achieved for the San Joaquin River system.

South Coast

Management focus will be on recovering southern steelhead stocks from impending extinction and this will be the highest priority for DFG's steelhead management.

Water development has caused severe habitat impacts to the Carmel River, including dewatering, a broadening of the channel, and loss of riparian habitat. A new dam has been proposed to increase the water supply in the region. The SWRCB should require identified measures to restore and maintain the steelhead population and should retain jurisdiction over the dam project to ensure that public trust values are protected.

DFG will seek interim and permanent flow regimes from Lake Cachuma on the Santa Ynez River to restore steelhead runs that have been eliminated by water development. The feasibility of providing passage around Bradbury Dam should be investigated.

Constructing a fishway on the Robles Diversion Dam on the mainstem Ventura River would restore access to about 10 miles of spawning and rearing habitat. DFG should begin discussion with responsible agencies regarding the removal or modification of Matilija Dam to allow access to about 10 additional miles of headwater spawning and rearing areas on Matilija Creek.

Recent construction of a fishway on the Vern Freeman Diversion should restore access to Sespe Creek, the largest and most pristine tributary to the Santa Clara River. Results of fish trapping at the Diversion facility in 1994 indicate that a viable steelhead population still exists in the Santa Clara River. Instream flow requirements for steelhead need to be investigated.

The major obstacle to restoring the steelhead run on Malibu Creek is Rindge Dam, located about 2.5 miles upstream from the Pacific Ocean. DFG is currently investigating the feasibility of removing this dam.

Conclusion

Watershed restoration and protection, providing adequate streamflows, and restoring access to headwaters need to be the focal points for DFG's efforts to restore steelhead populations. Establishment of conditions, constraints, and practices which maintain watershed integrity and stream flows, and restoration of problem areas which continue to degrade or block aquatic habitat, are of the utmost importance to restoring steelhead populations.

Restoration of steelhead populations is intimately tied to the establishment of a new ethic for management of California's rivers and streams - an ethic that places a much higher priority on the continuance of essential physical, biological, and ecological processes in rivers that are regulated or proposed for development. Without this, aquatic habitat will continue to degrade, steelhead and other species will continue to decline, and there will be continued impasses on water usage and development.

Santa Rosa Creek. Until the early 1980s, steelhead were abundant in the Santa Rosa Creek drainage. Steelhead, along with several other aquatic vertebrates, have declined substantially since this time, mainly due to the loss of instream habitat due to increased diversion and underflow pumping (Rathbun et al. 1991). Lack of sufficient flows has also impacted the lagoon, which at one time served as an important rearing area for juvenile steelhead. Few juvenile steelhead have been observed in the lagoon for several years (Rathbun et al. 1991; Jennifer Nelson, DFG Fishery Biologist, pers. comm.). Urbanization of lower stream channels and cattle grazing have also affected the stream (CDFG 1992d).

Chorro Creek. Chorro Creek is a large system relative to other San Luis Obispo County streams. The anadromous reach of this stream terminates at an impassable dam which impounds Chorro Reservoir. The middle reach contains the majority of spawning habitat, unfortunately most of this section becomes dewatered during the summer due to numerous agricultural diversions and the impoundment at Chorro Reservoir (Snider 1974). Effluent from a sewage treatment plant provides the majority of the summer habitat in the drainage.

In addition to the problems caused by water diversion and storage, thirteen significant migration impediments on the mainstem and tributaries were identified by DFG in the early 1970s (Snider 1974), most of which still exist (Nelson n.d.). These barriers prevent adult steelhead from utilizing the upper reaches where perennial flows occur.

Recommendations

- **DFG should continue to seek necessary flows to restore steelhead populations in San Luis Obispo County streams that are degraded due to over appropriation of water.**
DFG is involved with several interagency and community organizations to restore aquatic habitat and has filed protests with the SWRCB.
- **DFG should continue to protest water right applications on healthy streams unless sufficient bypass flows are established that will maintain habitat conditions in the streams, tributaries, and lagoons.**

SANTA YNEZ RIVER

Historically, the Santa Ynez River supported the largest steelhead run in southern California (Shapovalov 1945). Gibraltar Dam, completed in 1920, blocked access to much of the spawning habitat of the river system, including the upper mainstem and the Mono Creek system (Shapovalov 1945) (Fig. 22). The construction of the Cachuma Project (which

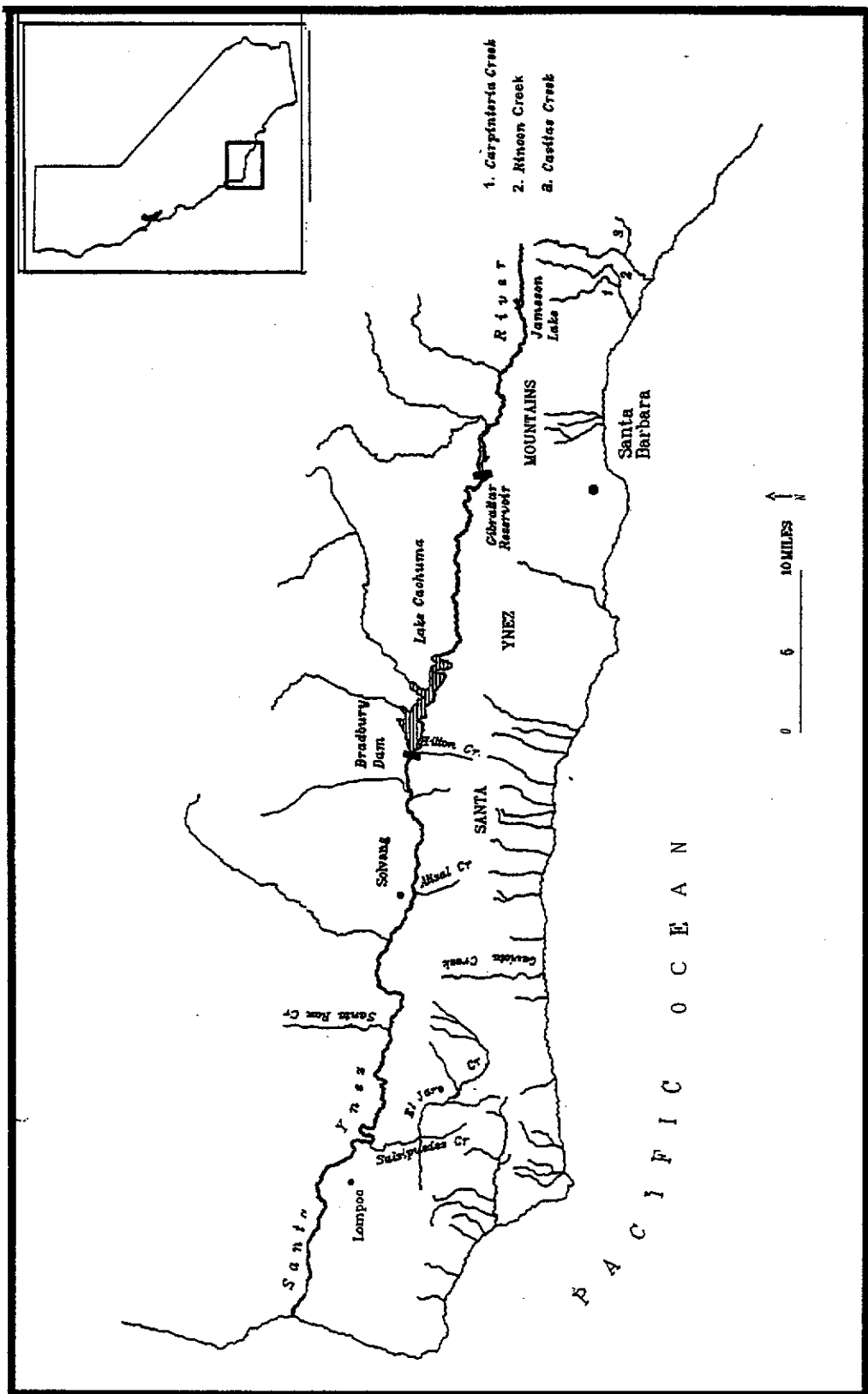


Figure 22. Santa Ynez River and coastal streams of Santa Barbara County.

includes Bradbury Dam) in the early 1950s eliminated access to nearly all historic spawning and rearing habitat. However, Shapovalov (1946) reported that excellent spawning habitat was present in the mainstem from Gibraltar Dam to the vicinity of Solvang, which is approximately 10 miles downstream of Bradbury Dam.

Bradbury Dam (Lake Cachuma) was authorized by Congress in 1948 as an emergency measure and was completed in 1953. After conducting pre-project fishery investigations, the U.S. Fish and Wildlife Service (USFWS) and DFG recommended that water be released from Bradbury Dam to provide migration, spawning, and nursery flows for steelhead. However, these releases for maintenance of the steelhead population were not authorized. Because of this, the steelhead run in the Santa Ynez River is nearly extirpated (CDFG 1975). Nehlsen et al. (1991) have categorized it as being at high risk of extinction.

Under conditions of the original water right permits issued to the U.S. Bureau of Reclamation (USBR) in 1958 for the Cachuma Project, USBR was to make releases that would maintain a "live stream" at prescribed downstream points to satisfy the needs of downstream water rights holders. In 1973, the SWRCB issued Order WR 73-37 which modified the original permits and allowed USBR to store all inflow to Lake Cachuma regardless of the persistence of the "live stream". This order was further modified in 1989 to provide greater releases to benefit downstream users and to extend the jurisdiction of the SWRCB to 1994. In 1994, the SWRCB issued Order WR 94-5 which reserved jurisdiction until 2000.

USBR is currently in the process of renewing its contract with the Santa Barbara County Water Agency to deliver water to the Cachuma Project Member Units for municipal, industrial, and agricultural purposes. Modification to project operations as a result of contract renewal may result in the need to revise USBR's water right permits, although the preferred alternative in the Final EIS/EIR for the contract renewal is to not change current project operations.

DFG has been a party to a Memorandum of Understanding (MOU) with USBR, USFWS, the Santa Barbara County Water Agency, the Member Units, and other interested groups to undertake cooperative fishery studies and to make recommendations for releases from Lake Cachuma to maintain fish and habitat. To provide water for this, a Fish Reserve Account consisting of up to 2,000 acre feet of water stored in Lake Cachuma has been established. Currently, the term of the MOU is for one year, after which it may be renegotiated or extended. The signatories to the MOU are proposing to extend the term to four years.

Above average rainfall in 1993 and 1994 created suitable migration flows and large rainbow trout/steelhead, were observed in the mainstem and tributaries. Several large rainbow trout/steelhead (16 to 18 inches) were captured and released in Hilton Creek in 1993 (CDFG 1993c). There were also anecdotal reports of anglers catching large rainbow trout in 1993. In 1994, a rainbow trout/steelhead estimated to be approximately 22 inches in length was captured in the mainstem (Trautwein 1994) and large rainbow trout were also observed in Hilton and Salsipuedes creeks (CDFG 1994a). Salsipuedes Creek tributaries and Hilton Creek still contain accessible spawning and rearing habitat. In 1995, several large rainbow trout that appeared to be steelhead were observed spawning in Hilton Creek. Several months later, swim-up fry were observed in the stream (Maurice Cardenas, DFG Fishery Biologist, pers. comm.).

There has been some question whether the rainbow trout observed in the lower Santa Ynez River are anadromous or have been introduced through catchable trout stocking in Lake Cachuma. There are examples of rainbow trout emigrating from reservoirs, establishing residence in downstream waters, and attempting to spawn in reservoir tailwaters and tributaries. However, rainbow trout used in catchable trout stocking programs typically have shorter life spans and do not grow as large as adult steelhead (Dennis P. Lee, DFG Senior Fishery Biologist, pers. comm.).

The Coastal Branch of the California Aqueduct (State Water Project) will bring approximately 45,000 acre feet of Central Valley water per year to Santa Barbara County. This project is currently under construction and is scheduled to be operational in 1996.

Portions of the river below Bradbury Dam suffer from habitat and channel degradation. Off-highway vehicles, pipeline construction, gravel mining, and riparian vegetation removal for flood control purposes has resulted in a broadening of the channel, subsurface flows, and loss of the riparian corridor.

- **DFG will seek a permanent flow regime from Bradbury Dam to restore the steelhead resource to a reasonable level and maintain it in good condition. This includes providing adequate streamflows for adult and juvenile migration, and mainstem spawning and rearing habitat.**

USBR recontracting, SWRCB continued jurisdiction hearings, and additional water from the State Water Project may present good opportunities to rectify past actions which have resulted in the near extirpation of the Santa Ynez River steelhead and a diminishment of public trust resources. The question of whether rainbow trout present in the Santa Ynez River below Bradbury Dam are resident or anadromous is not pertinent to the need to mitigate for past water development. DFG will negotiate mitigation on the basis that

historic steelhead runs have been nearly eliminated by water development and actions to restore this public trust resource need to be implemented.

Recommendations

- **The feasibility of providing adult and juvenile passage around Bradbury Dam should be investigated and implemented accordingly.**

Nearly all historic spawning and rearing habitat is located upstream of Bradbury Dam, therefor blocked access is probably the most significant limiting factor for steelhead. Because of the height of Bradbury Dam, trap-and-truck and smolt capture facilities are probably the only feasible means to restore access.

- **Short-term efforts to restore Santa Ynez River steelhead should focus on the following:**
 - * **Restore and enhance spawning and rearing habitat conditions in Hilton, Alisal, and Salsipuedes creeks and other tributaries of the Santa Ynez River below Bradbury Dam.**

 - * **Provide adequate interim releases from Lake Cachuma.**

DFG should identify and seek flows needed for fisheries investigations and to maintain steelhead habitat until more permanent restoration measures are implemented. This will be done preferably through the MOU process.

 - * **Investigate status and habitat needs.**

 - * **Investigate the feasibility of modifying the release schedule of water released from Bradbury Dam to downstream users so that it provides benefits to fish and wildlife.**

Currently, the water is released on an as-needed basis as called for by the Santa Ynez River Water Conservation District, which provides relatively little benefit to aquatic species and habitat.