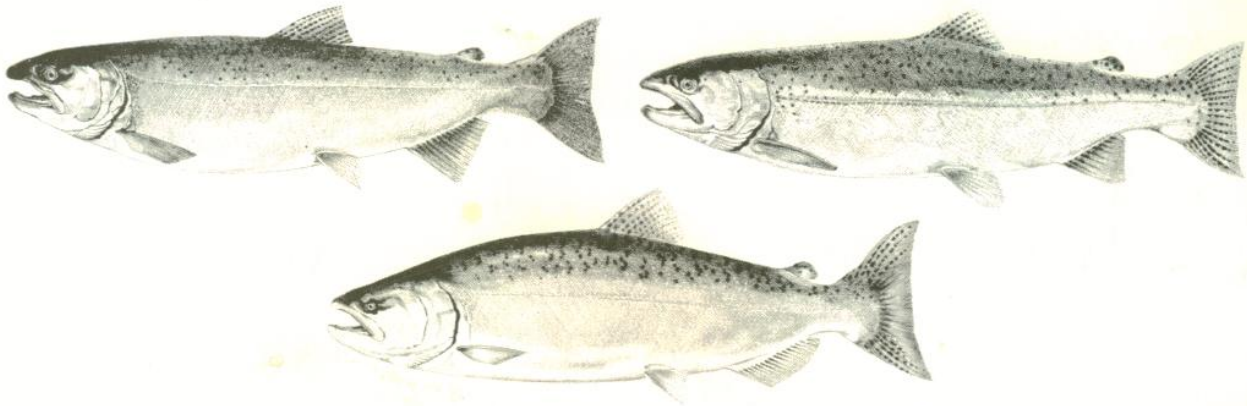
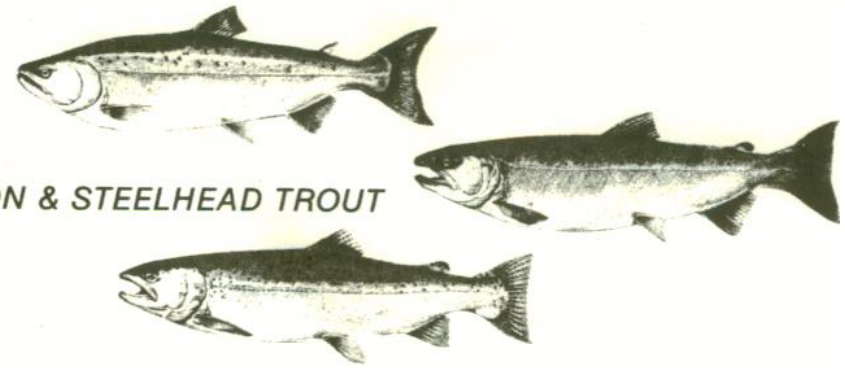


THE TRAGEDY CONTINUES

Advisory Committee
on
Salmon and Steelhead Trout

1986 Annual Report



ADVISORY COMMITTEE ON SALMON & STEELHEAD TROUT

October 10, 1986

Dear Colleague:

It is a pleasure to share with you the 1986 annual report of the California Advisory Committee on Salmon and Steelhead Trout. The report lays out the findings and recommendations of the Committee during its first full year of work, 1985.

Our citizen's committee was created in late, 1983 by the Legislature to develop a strategy for restoring California's native salmon and steelhead resources. The damage to these fish in recent years, primarily from the destruction of aquatic habitat by water exploitation and pollution, has cost our state nearly $1 billion in reduced fish harvest and lost recreation use.

The eleven appointed members of the Committee represent the fishing industry, sportsfishing interests, fish scientists, Native American users and the public at large. The Committee must submit its plan to the Legislature, the California Fish and Game Commission and the Director of Fish and Game in 1988.

Community volunteers are surveying each watershed in the state having salmon and steelhead spawning runs, or potential runs. Committee members are researching water laws, land use issues, local government concerns, genetic trends in the fisheries and public conservation education opportunities. The Committee's recommendations on these issues, together with the findings of the community volunteers, will form the basis of the state action plan.

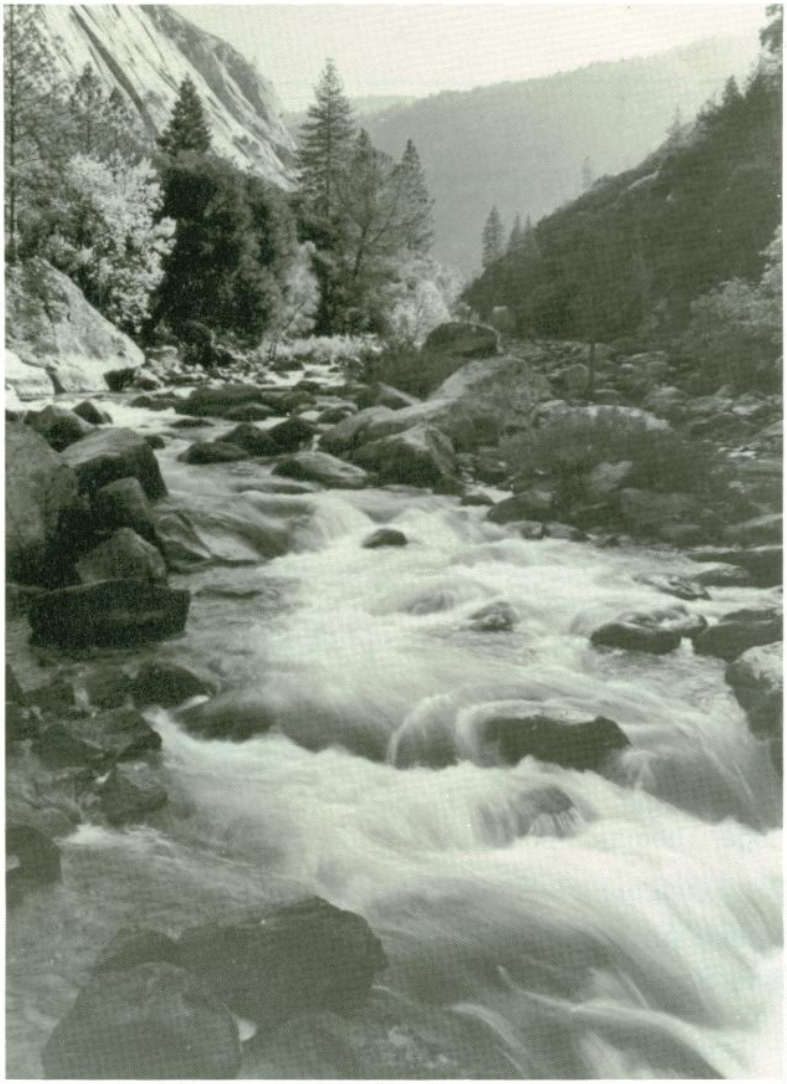
We hope you will find our report useful. We welcome your reaction to it.

Sincerely,

Earl Carpenter

EARL CARPENTER,
Chairman

#120 SCHOONMAKER POINT, FOOT OF SPRING STREET, SAUSALITO, CA 94965
(415)331-4505



Friends of the River/Pat Carr

Merced River at El Portal

People, plants and animals all need water to survive. Fish cannot exist without it. Anadromous fish, like salmon and steelhead trout, need specific waters to perpetuate their kind. On this wild river, historic spawning habitat has been preserved. But in many other areas throughout California, the loss or degradation of critical habitat poses a serious threat to this unique resource, to this part of California's wildlife legacy...

THE TRAGEDY CONTINUES

1986 Annual Report

prepared by

The Advisory Committee on Salmon and Steelhead Trout
pursuant to Chapter 1686 of the Statutes of 1984

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Committee Members

Salmon and Steelhead Advisory Committee

Members	Alternates
Commercial Fisheries	
Earl Carpenter, Chairman	Mel Zell
Scott T. Downie	Kevin Collins
Zeke Grader (appointment pending)	Tom McCray
Bill Maahs	Mike Maahs
Sport Fisheries	
Bob Hayden, Secretary	Claude Warden
Dick Hubbard	Ralph Kanz
Richard May	Alan Lufkin
Roger Thomas, Vice Chair	Craig Hanson
Native American	
Terry Brown (appointment pending)	Walt Lara (appointment pending)
Biologist	
Cindy Deacon Williams, Treasurer	Terry Roelofs
Public	
Nancy Reichard (appointment pending)	Aldaron Laird

TABLE OF CONTENTS

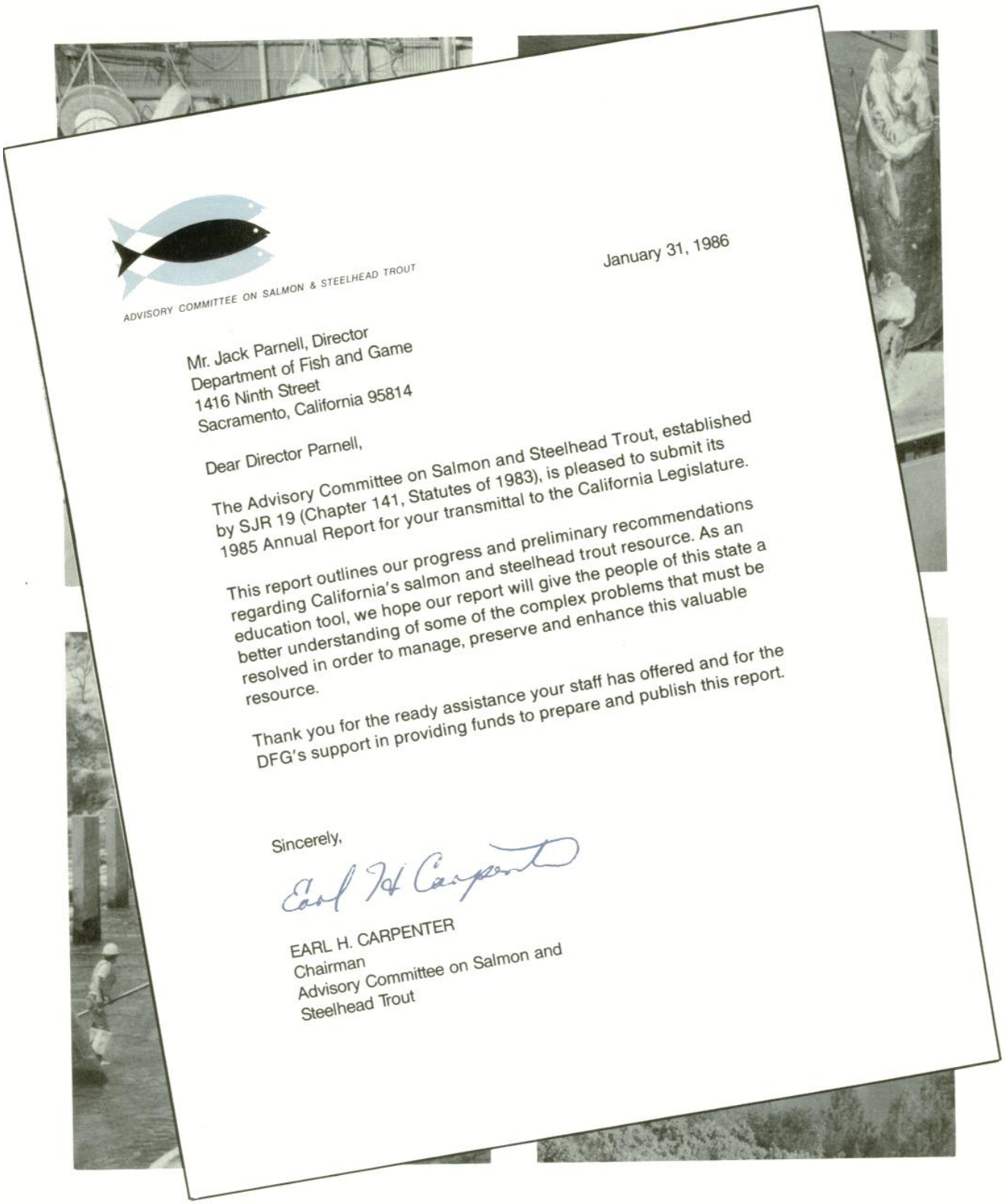
Letter of Transmittal 4
Executive Summary 5
Introduction 6
Authorization 6
Organization 7

SECTION ONE: MAJOR TOPICS

Water 8
Economics 10
Habitat 12
Hatcheries: Artificial Propagation 14
Genetics 16
Interagency Coordination 17
Laws and Law Enforcement 20
Research and Data Collection 22
Conservation Education 24

SECTION TWO: BASIN MANAGEMENT REGIONS AND PLANS

Map Legend 25
Introduction 26
Smith River, Redwood Creek, Mad River Region 26
Klamath River, Lower Trinity River 27
Trinity River Upstream from Hoopa 28
Mattole River, South Fork Eel River,
Lower Eel River, Van Duzen River 29
Upper Eel River 29
Sacramento River System 30
Marin, Sonoma & Mendocino County Coastal Streams 31
Russian River 32
San Francisco Bay Streams 32
San Joaquin River System 33
South Coast Streams 33
Recommendations for Legislative Action for 1986 34
Conclusion 36



ADVISORY COMMITTEE ON SALMON & STEELHEAD TROUT

January 31, 1986

Mr. Jack Parnell, Director
Department of Fish and Game
1416 Ninth Street
Sacramento, California 95814

Dear Director Parnell,

The Advisory Committee on Salmon and Steelhead Trout, established by SJR 19 (Chapter 141, Statutes of 1983), is pleased to submit its 1985 Annual Report for your transmittal to the California Legislature.

This report outlines our progress and preliminary recommendations regarding California's salmon and steelhead trout resource. As an education tool, we hope our report will give the people of this state a better understanding of some of the complex problems that must be resolved in order to manage, preserve and enhance this valuable resource.

Thank you for the ready assistance your staff has offered and for the DFG's support in providing funds to prepare and publish this report.

Sincerely,

Earl H. Carpenter

EARL H. CARPENTER
Chairman
Advisory Committee on Salmon and
Steelhead Trout

LETTER OF TRANSMITTAL

EXECUTIVE SUMMARY OF REPORT

Salmon and steelhead trout have played an important role in California's history. Many people in the state use and rely on this valuable, renewable resource. The fisheries industries, in fact, make an important contribution to California's economy. There is little doubt that the well-being of these industries is tied closely to the health of salmon and steelhead stocks throughout the state.

Over the years, however, some disturbing declines have occurred in California's salmon and steelhead fisheries. In late 1983, in response to public concern about these trends, the Legislature's Joint Fisheries and Aquaculture Committee reestablished a special advisory committee on salmon and steelhead trout. This committee was directed by the Legislature to develop a comprehensive management plan for the preservation, protection, restoration and enhancement of salmon and steelhead trout resources in California.

The committee consists of eleven (11) appointed members and their alternates. There are representatives from the commercial salmon fisheries (4), sportsmens' fisheries (4), Native American interests (1), the general public (1) and one fisheries biologist. The Department of Fish and Game (DFG) has provided consultant service and interim funding to date. Legislative funding of $125,000 per year is sought, but not yet confirmed. Such funds will cover employment of a professional executive secretary and expenses related to needed contractual services.

In order to meet the challenge of restoring and enhancing the state's salmon and steelhead fisheries, the committee is developing a two-part plan described, in detail, in this 1985 Annual Report.

The first section of this plan investigates nine areas of general concern that affect this resource. The nine areas are: water, economics, habitat, hatcheries, genetics, interagency coordination, laws and law enforcement, research and data collection and conservation education. The findings and recommendations presented in section one span two years of investigation and include input from many, many people. Each subject area includes a general discussion of the findings, followed by recommendations for action.

Three conclusions from these investigations are compelling:

1) Salmon and steelhead production and utilization are an important part of the state's economy.
2) There has been a significant loss or degradation of suitable habitat and a resulting reduction in production.
3) Immediate action must be taken to begin to reverse these trends and restore this valuable resource.

The second section of the plan takes into account another reality investigated by the committee: California's salmon and steelhead habitat is spread throughout several geographically distinct regions of the state. To facilitate planning, the committee has divided the state into eleven geographic regions to be considered individually. A subcommittee was appointed to study each region or basin and to seek out local specialists to provide information.

In section two, each basin is described and some preliminary thoughts about management are offered. Every basin study group is following a uniform format and will amass information on historical conditions, current status of the resources, current problems, corrective measures, obstacles to resolving problems and recommendations for action. Local input is sought to assure that, once developed, basin management plans will have a base of local involvement and support.

The 1985 Annual Report is considered a working document. In the coming years, the recommendations for the nine areas and the eleven basin management plans will be integrated to form the basis of a sound and effective management plan—a plan that addresses the problems posed to salmon and steelhead trout by agriculture, hydroelectric plants, developments, water diversions and other land and water use practices that have degraded habitat and led to declines in a resource that's important to California's economy.

INTRODUCTION

Salmon and steelhead trout have played a long and important role in California's history. From sport fishermen and Native Americans to commercial fishermen and distributors, many rely upon this valuable state resource. Salmon and steelhead trout are a living, renewable resource; consequently, the health and future of the fisheries industries are integrally tied to the prosperity of salmon and steelhead stocks throughout the state.

During the pioneer days, California had abundant salmon and steelhead trout (anadromous fish) and plenty of pristine habitat. The rest of the story is history. Development, irrigated agriculture, hydroelectric plants, water diversions, logging and other water and land use practices have seriously reduced and/or degraded salmon and steelhead trout habitat. Without suitable habitat, fish populations decline. The impact is felt acutely by the fisheries industries. The commercial salmon fishery has faced continual declines in fishing opportunity and harvest; even sport fishing has been severely curtailed. This trend must be stopped and reversed if these industries are to continue to play a role in the state's economy.

In the following pages, the Salmon and Steelhead Trout Advisory Committee, appointed by the California Legislature, provides a summary of its initial investigations of and recommendations for the state's salmon and steelhead trout resource. This annual report is a working document, not a final report. It outlines the progress made in fulfilling the Legislature's directive to develop a comprehensive management program for the preservation, protection, restoration and enhancement of salmon and steelhead trout resources in California.

AUTHORIZATION

The Advisory Committee on Salmon and Steelhead Trout was reestablished by the Joint Committee on Fisheries and Aquaculture, in consultation with the Fish and Game Commission and the Director of the Department of Fish and Game (DFG), pursuant to Resolution Chapter 141 of the Statutes of 1983. The Committee was later modified by Chapter 1686 of the Statutes of 1984. It was formed to investigate and address the problems facing the salmon and steelhead trout resource. Although the Committee has functioned for two years, its activities have been limited because no funding has been provided to help the Committee meet its responsibilities.

The eleven members of the Committee (and their alternates) have practical knowledge of and experience in the following areas:

a) Commercial Salmon Industry—four representatives
b) Inland/Ocean Fisheries Sportsmen's Groups—four representatives
c) Native American interests—one representative (confirmation pending)
d) Biologist—one representative
e) Public interests—one representative (confirmation pending)

ORGANIZATION OF REPORT

This Annual Report is divided into two major sections. In the first, nine (9) important subject areas are identified that merit further consideration and investigation. Each subject area includes a general discussion of the findings, followed by recommendations for action. As the Committee's investigations continue, new information and analyses of present findings will enable more specific recommendations to be made.

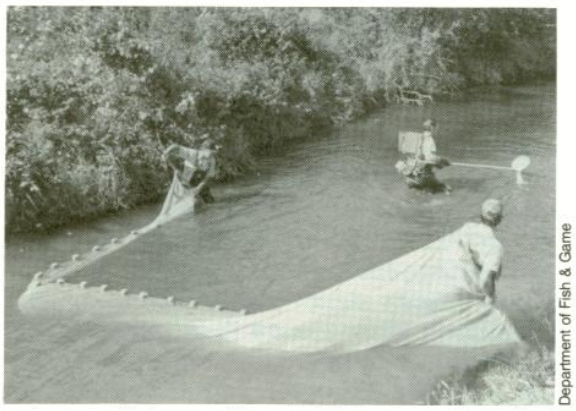
In the second section, eleven (11) geographic regions of importance to salmon and steelhead trout are described. A subcommittee has been or will be formed to develop a specific Basin Management Plan for the regions discussed. A summary of progress to date on these plans is provided. Ultimately, each Basin Management Plan will outline a specific program that will assist in the recovery and enhancement of the salmon and steelhead trout resource in that region.

"In 1850 in the [Klamath] River during the running season, salmon were so plentiful, according to the reports of early settlers, that in fording the stream it was with difficulty that they could induce their horses to make the attempt, on account of the river being alive with the finny tribe."

attributed to R. D. Hume 1931

King Salmon at Shasta counting facility.

Redding Record/Searchlight



Department of Fish & Game

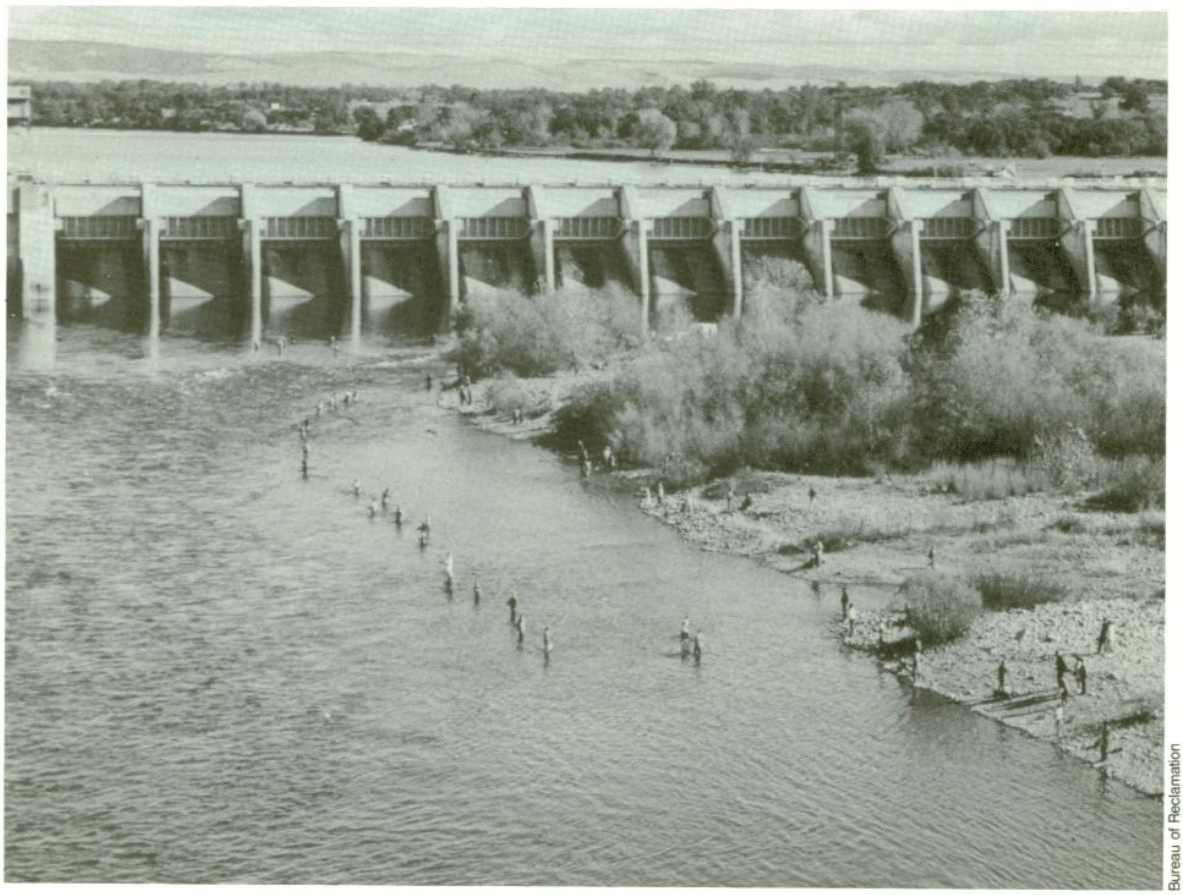
Department of Fish & Game

Above: King salmon and steelhead trout stranded annually in a Tehama County irrigation ditch are herded by DFG personnel toward a fish screen.

Right: The captured fish are scooped into nets, placed into waiting transport trucks and released into the river.

Below: Sportfishing at Nimbus Dam.

Page 9: Summer irrigation diversions leave little habitat for salmon and steelhead trout on a creek near the Scott River.



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SECTION ONE: MAJOR TOPICS

WATER

It is appropriate that these discussions begin with water, for this precious element is vital to life. People, plants and animals all need water to survive. Fish cannot exist without it. And for anadromous fish, like salmon and steelhead trout, not just any water will do. Salmon and steelhead trout rely on specific waters to perpetuate their species.

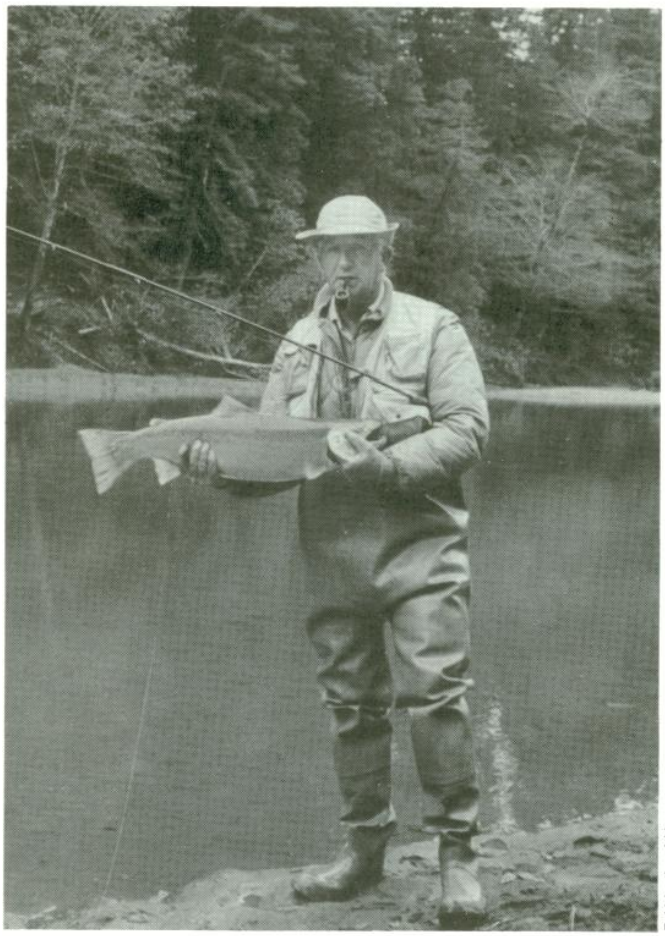
While water is life for fish, it is also a precious resource that is used by others. Everyone—industrial, agricultural, urban and "natural" users alike—needs water. But today, the many needs for and uses of water frequently lead to conflicts. In some areas of California (Trinity River, Lewiston Dam/San Joaquin River, Friant Dam) salmon and steelhead trout resources have suffered dramatically due to development or other water use practices. There is no single culprit. Hydroelectric projects, irrigated agriculture, dams for water diversion and other uses, the lack of fish screens on many diversions, the removal of riparian vegetation, poor water quality due to discharges or runoff—these are just some of the activities that contribute to losses in anadromous fish populations. In order for salmon and steelhead to be preserved and to thrive, steps must be taken to prevent further losses of water and to restore this resource so vital to the very existence of salmon and steelhead trout.

While most people know that fish need water, too, few realize the extent of the current demand placed on the California watershed. In the state's pioneer days, there was an abundance of water (and anadromous fish) in relationship to a small human population and limited irrigated agriculture. Our laws, regulatory procedures and institutional arrangements were based on the perceived surplus of water and the desire to develop our "unused" natural resources. Over the years, however, California has changed. It has evolved from a state rich in undeveloped natural resources, that supported abundant salmon and steelhead trout populations, to a state with abundant irrigated agriculture, but only remnant and declining salmon and steelhead trout stocks. Despite this dramatic reversal, our policies, laws and regulations have changed little and do not adequately address the current state of this resource.

RECOMMENDATIONS

The Committee will investigate new water policies and institutional arrangements appropriate for the next decade and long-term programs. Such changes should strike a balance between developed and undeveloped resources, and permit a variety of uses and users to exist without detriment to each other. The revision of water policies, laws and institutional arrangements is imperative and must be hastened in order to restore, preserve and enhance salmon and steelhead trout resources.

Redding Record/Searchlight



R. Valentine Atkinson

"While some Californians may shudder to consider this precious, living resource in dollars and cents, the fact is that salmon and steelhead trout play an important role in the state's economy."

Left: A California steelhead trout from the Gualala River.

Center: Spud Point Marina, Bodega Bay.

Below: Water is piped from the Trinity River to Judge Francis Carr Powerhouse, which is part of the Bureau of Reclamation's Central Valley Project.

Earl Carpenter

Bureau of Reclamation

ECONOMICS

The economic value of California's salmon and steelhead trout has been a subject of interest to the Legislature and the public for many years. While some Californians may shudder to consider this precious, living resource in dollars and cents, the fact is that salmon and steelhead trout play an important role in the state's economy. It is now possible to determine the direct economic value of these resources to the commercial and sport fishing industries. Specifically, the dollar value can be determined for commercial salmon sales, for the jobs created and for the effects of this segment of the commercial fishing industry on the total economy of California. It is even possible to estimate the dollar value of the several sports fisheries. No doubt such information would be extremely useful in setting policies for this resource.

The value of the salmon and steelhead trout resource extends beyond the commercial and sport fishing industries, however. Fisherman's Wharf, Noyo Harbor and many other ports up and down the coast have salmon fishing fleets, harbors and wharves that serve as attractions for tourism. While the value of tourism has never been calculated in the past, procedures can be developed to make this determination and to place an economic value on any other aspect of California's salmon and steelhead trout resources. At some time in the future, we may even be able to determine the value of the seemingly priceless heritage of the salmon and steelhead trout resource itself.

RECOMMENDATIONS

In addition to making improved valuations of the many aspects of these resources, the Committee intends to contract with economists and other experts to consolidate these values into a new assessment methodology that calculates the full value of salmon and steelhead trout to the state of California. This methodology will utilize both traditional and non-traditional economic values in calculating the value of salmon and steelhead trout resources. Furthermore, the Committee hopes to identify the contribution these resources make on both a local and statewide basis. A community of consultants and other economic experts is ready to assist in methodological development, but cannot begin until funding of services is assured.

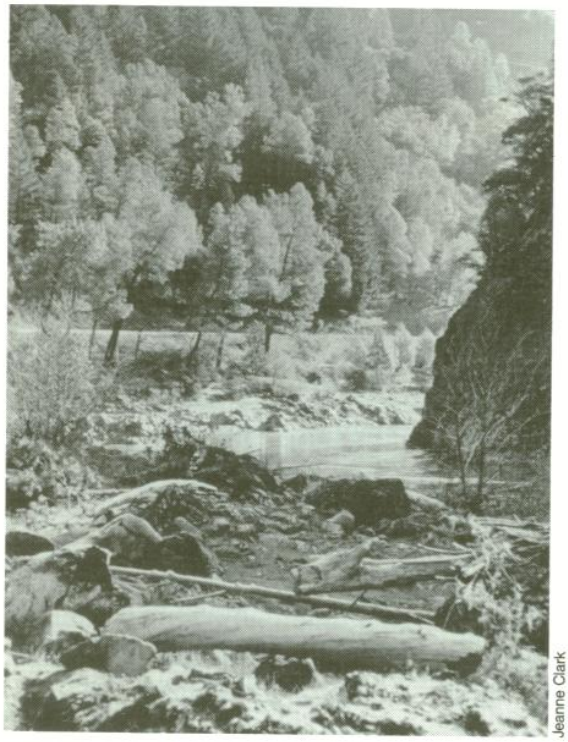
Dick Pool

HABITAT

As with all living things, the well-being of salmon and steelhead trout is integrally tied to the condition of their environment. Anadromous fish require a very special riparian and stream environment. Without a doubt, the quantity and condition of that environment must be suitable for survival and reproduction.

A general rule of biology holds that if a natural habitat is reduced to one-tenth (1/10) of its original size, about 50% of its constituent species will be lost. Historically, salmon and steelhead trout have inhabited many of California's waters. Due to loss of habitat quality and quantity, 96% of the historic salmon habitat has been eliminated from salmon production. This alarming loss of habitat has had a serious impact on the state's salmon and steelhead trout resource.

Anadromous fish habitat has been lost or degraded in nearly all the rivers, streams and creeks that have historically supported these fish. The north coast's Trinity River has seen salmon production drop 75% and steelhead trout production plummet 80%. The Sacramento-San Joaquin system suffered a loss in salmon production of more than 65% between 1940 and 1969. Present runs in the Sacramento-San Joaquin are well below those that supported the 1882 commercial salmon catch of 12 million pounds. Along the central coast, the Carmel River steelhead trout run has declined by 65%, and the majority of the Pajaro River's anadromous fish runs have been lost. To the south, anadromous runs have been essentially eliminated, even though steelhead trout once entered most south coast drainages. Efforts to compensate for these losses have been only partially successful, at best. While this Committee's investigations have been directed toward salmon and steelhead trout, consider the many other species of wildlife that also shared—and have lost—this habitat.

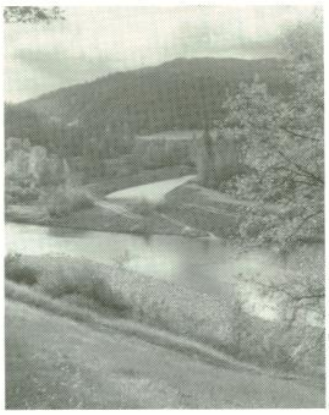

Jeanne Clark

Yuba River

It is obvious that salmon and steelhead trout now must compete with other uses for their native habitat. Anadromous fishes must contend with the pressures of dams and diversions, bank stabilization, stream channelization, removal of riparian vegetation, soil erosion, waste water return, pollution, exotic species, flood control activities and the ever increasing offstream demand for more water. These modifications have led to many changes—in temperature regime, flow regime, sedimentation pattern, chemical composition of water, rate of gravel recruitment, shading, predation, interspecific competition, disease, parasitism and habitat availability, among others. When considered together, these changes "add" up to a loss—a loss in the quantity and quality of habitat available for anadromous fishes statewide.

Management of fish habitat must involve measures that prevent future damage and restore habitat damaged by past activities. More is being done to restore salmonid habitat than has occurred previously; however, it is clear that this is only a beginning and much remains to be done. Significant habitat degradation is still occurring due to the many previously mentioned causes.

Department of Fish & Game



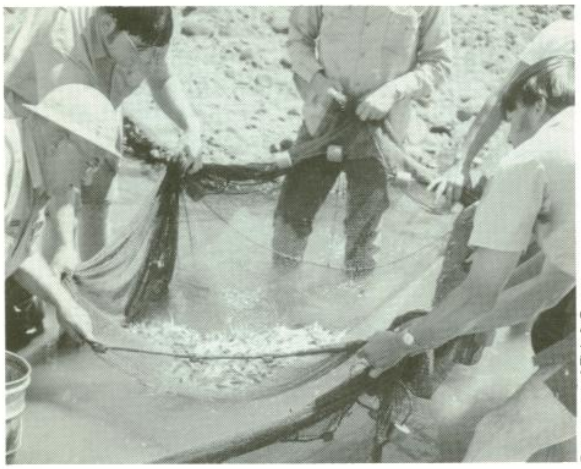
Bureau of Reclamation

Far left: A helicopter places a steep-pass fish ladder in Bluff Creek, Humboldt County.

Left: A sediment catch basin was made by the Bureau of Reclamation as part of a dredging operation to remove sandy decomposed granite that washes down from the nearby hills. It helps maintain the channel and flow of the Trinity River, pictured in the foreground.

Lower Left: DFG personnel rescue salmon fingerlings from a drying stream in Tehama County.

Below: A dredge removes gravel from the bottom of the Trinity River to create "rest" holes for salmon.



Department of Fish & Game

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RECOMMENDATIONS

The Committee will identify the effects of habitat modification on the state's salmon and steelhead trout resource. It will identify and explore management strategies that have been successful in compensating for past habitat losses. An effort will be made to identify current land use practices that allow continued habitat degradation, and to outline changes that could allow the peaceful coexistence of non-fish and anadromous fish activities.

Specifically, it is almost always more cost-effective to prevent damages than to clean up afterwards. To be effective, any approach aimed at *preventing* damage to fish habitat should include a systematic analysis of the cause, nature and extent of habitat degradation. Potential approaches to problems will be identified and prioritized, utilizing input from all parties involved.

In order for habitat *restoration* to occur most efficiently, the condition of salmonid habitat throughout California must be inventoried systematically. The potential for site-specific restoration should be assessed, along with potential solutions. Restoration needs should then be prioritized. Funds and effort can be expended on those projects which will be the most effective. Projects must be monitored regularly to help guide future decision-making. It is extremely important to base restoration efforts on a sound plan, beginning at the state level, as the need for restoration of salmonid populations is urgent and only limited resources are available for the task.

The Committee will work to identify and implement means by which both habitat protection and habitat restoration needs can be handled in a cost-effective manner.

HATCHERIES: ARTIFICIAL PROPAGATION

Because of the aforementioned loss and degradation of anadromous fish habitat, hatcheries have come to play a vital role in restoring and augmenting wild salmon and steelhead trout production. Hatcheries propagate fish for subsequent release to the wild.

As with the California condor, there are polarized opinions regarding the role of hatcheries and anadromous fisheries management. Some feel that the habitat loss is so great that all efforts should be made to save these native species through hatchery propagation programs. Others are convinced that the task at hand is to restore and protect native habitat and native stocks out of fear that hatchery stock will disrupt the genetics of native stock. Still others find value in each approach.

This issue must ultimately be addressed, but in the interim, hatcheries are an important reality in California. If they are being used, they must be used effectively. The following should be considered:

1) There must be enough, sufficiently modern hatchery facilities to handle the annual demand for salmon and steelhead production.
2) Management and operation procedures must be based on timely research and trends.
3) Suitable habitat must exist into which hatchery stocks can be released.

The Committee contacted several hatcheries and all of them identified ways to improve the operation of their facilities. There was agreement on the need for more research; there was also consensus on the need to modernize and expand existing facilities and to construct new ones. Most hatcheries were capable of implementing small changes using internal funds when monies are available. However, large problems—such as inadequate water supply (Iron Gate), thermal water problems (Feather River), a lack of planting tankers (Nimbus, etc.) or disease (Coleman/Lewiston)—require additional assistance. And in some cases, funding must come from non-hatchery sources. For example, Coleman Hatchery received an appropriation of $2.2 million to start correcting its problems.

Recently, help has been provided through the Commercial Salmon Trollers Enhancement and Restoration Fund (Salmon Stamp Fund). The Fund has supported needed work at Thermolito Ponds, Mokelumne River Ponds, Merced Fish facility and Iron Gate Ladder. The Salmon Stamp Fund has also played a key role in supporting the Sacramento River Yearling Program. While it is commendable that commercial and sport fishermen are willing to tax themselves to maintain and modernize such facilities, the full cost of upgrading these facilities is beyond the commercial fishermen's ability to pay. Some question the fundamental fairness of asking the commercial and sport fishermen to pay the costs of correcting problems they did not cause. This is particularly true in regards to facilities that were originally constructed to mitigate for water diversions or developments that benefit other users.

RECOMMENDATIONS

The state's anadromous fish hatchery system must be upgraded. To do this effectively, an overall plan for hatcheries should be developed. Such a plan should include a strategy and timetable identifying the role, contribution and the levels of production for all hatchery facilities. An information pool must be developed to assist in the establishment of realistic production level goals based on sound biological data for both mitigation and enhancement production levels. Policy positions must be formulated for fundamental issues, such as the development of artificial propagation facilities on the north coast.

To handle these responsibilities, the Committee will examine the feasibility of creating and funding a Director of Anadromous Fish Hatcheries, a senior position with the Anadromous Fisheries Branch of the DFG. This person would be responsible for overall planning, coordination and supervision of all anadromous fish hatcheries.

In the coming year, the Committee will also consider the possibility of creating an emergency fund to handle the critical needs of the most severely affected hatcheries.

Finally, the Committee recommends that, as a basic policy, those who construct

facilities as mitigation for their actions must continue to provide the capital outlay for the operation, maintenance and improvement of these facilities. Just as water rights and other developments continue to provide benefits to project beneficiaries for the long term, the responsibilities and costs must also be borne by the project beneficiaries for the life of the project. To shift costs to the general public and more particularly, to those who suffer as a result of the development, is not in keeping with established public policy on similar matters.

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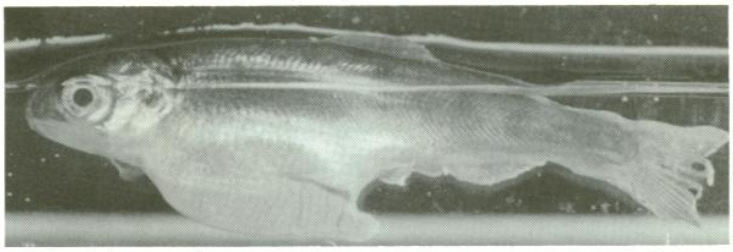


Bureau of Reclamation

Top: A carefully measured quantity of fertilized salmon eggs is placed into incubation trays at the Lewiston Fish Hatchery.

Center: Salmon fry.

Bottom: Lewiston Dam and Fish Hatchery.

Bureau of Reclamation

Bureau of Reclamation

GENETICS

Bureau of Reclamation

Above: Hatchery activities provide opportunities to study genetics and other aspects of fish production.

The issue of genetics is frequently raised when discussing hatcheries or other proposals to restore, enhance or preserve salmon and steelhead trout. Since there are many strains of salmon and steelhead trout, it is vital for anyone who manipulates the species and its habitat to consider genetics.

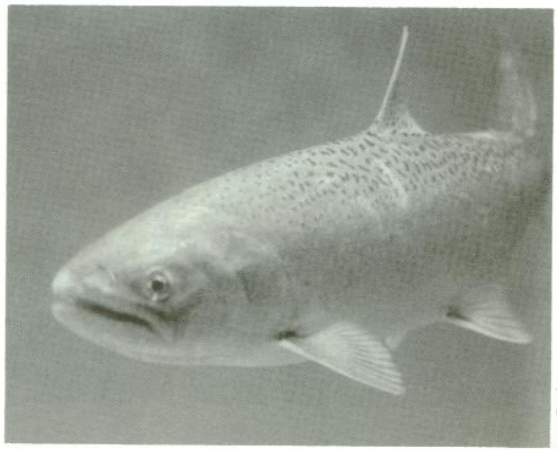
The genetic character of a fish becomes especially important whenever large scale artificial propagation occurs. Stocks of fish that inhabit certain areas have evolved and effectively adjusted to the environmental conditions that they encounter. For example, Sacramento has four distinct runs made up of stock that have adapted to different conditions. The introduction of non-native (hatchery) stocks there or elsewhere could adversely effect the genetic makeup of native stocks and lead to reductions in productivity. If the introduction of non-native genes is continued on a large scale, through time, there can be a complete loss of the native gene pool. This can ultimately lead to the extinction of a species. This would be a great loss and these unique genes should be protected.

Early in the century, interbasin transfers of young salmon were a common practice. The DFG now restricts the transfer of non-native stocks for a variety of reasons, including prevention of the spread of infectious disease.

RECOMMENDATIONS

A management plan for salmon and steelhead trout must include guidelines for planting hatchery stocks in areas where production in the wild already occurs. This will help protect the genetic character of wild fish and effectively utilize the production potential of artificial propagation.

When changes in the habitat occur, the genetic character of the stocks must be considered and reevaluated, if necessary. Radical changes that result from large water projects may so change the environment that native stocks are no longer able to survive in the altered habitat. Under such conditions, decisions regarding the protection of native stocks must be made. A protocol for making these decisions will be formulated by the Committee.



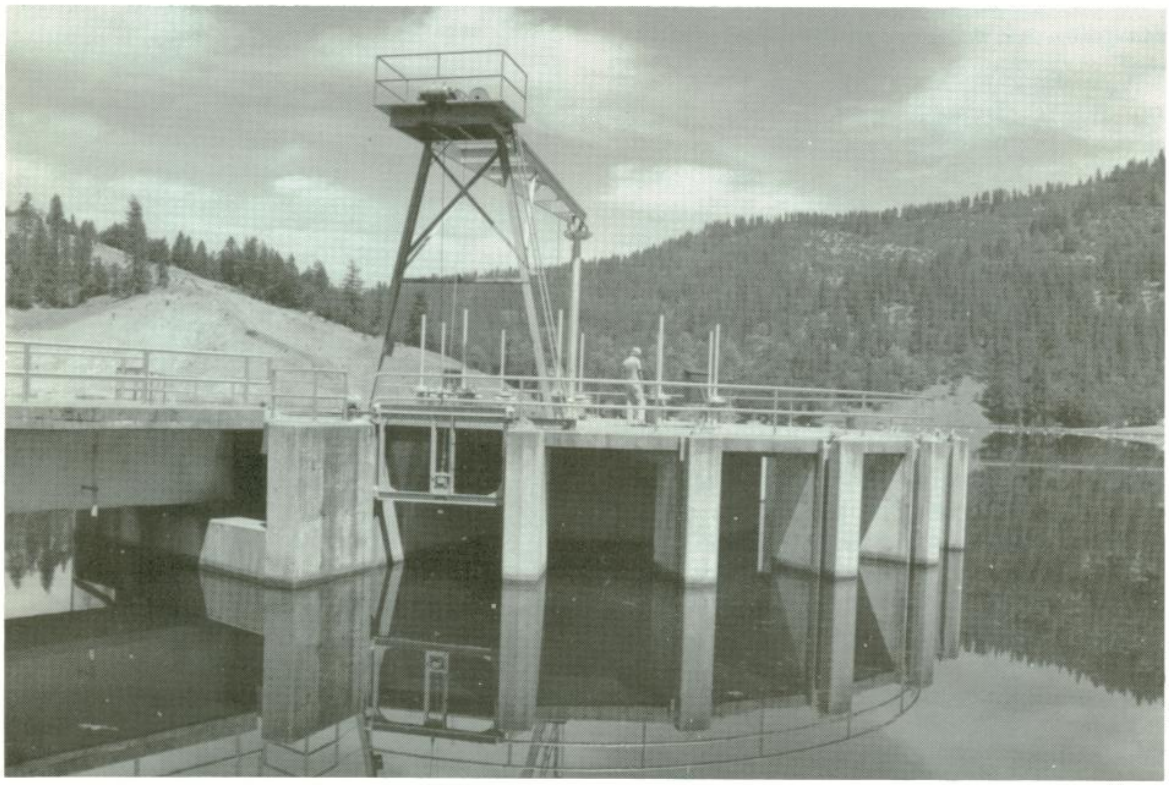
Dick Pool

INTERAGENCY COORDINATION

Like all of California's fish and wildlife resource, salmon and steelhead trout are under the jurisdiction of many local, state and federal agencies. The difficulties of sharing information and coordinating projects when several agencies are involved are well known. Even more worrisome is the fact that many of these agencies are *unable* or *unwilling* to reconcile differing management goals. Some groups are unable to compromise their goals because their own legislative or administrative directives may not provide enough flexibility. But some agencies are simply unwilling to place their vested interests second in a conflict. Unfortunately, there are no laws that require the needs of salmon and steelhead trout to be addressed when these groups get together to work out a compromise on specific projects. The net result of these communication difficulties was aptly summarized by Bill Sweeney, retired United States Fish and Wildlife Service Area Manager, who said "When water projects conflict with fishing needs, the fish always lose..."

Agencies that deal with salmon and steelhead trout resources fall into two broad categories: 1) those whose mandates don't relate specifically to salmon and steelhead trout resources but whose actions can impact the fisheries resource and 2) those with mandated responsibilities to protect and manage these same resources. The second category includes agencies directly involved with salmon and steelhead trout and can be further broken down into those agencies most involved with *fishery production* and those most involved with *fish utilization.*

There are many agencies in the first category whose responsibilities lie in other areas but whose actions have had an impact on salmon and steelhead trout. This group includes, among others,the US Bureau of Reclamation, US Army Corps of Engineers, US Forest Service, the California Department



Bureau of Reclamation

A view of the Clear Creek Tunnel intake structure, part of the Bureau of Reclamation's Central Valley Project.

Department of Fish & Game

A CCC crew helps the DFG fence a meadow to prevent grazing and erosion at nearby spawning habitat.

of Water Resources and the State Reclamation Board. Through their actions, these agencies permit development and alteration of fisheries habitat — often with detrimental results. Some of their activities that have affected the fisheries include the Central Valley Project (Bureau of Reclamation), The State Water Project (Department of Water Resources), forest management plans (US Forest Service) and the proposed Riprapping of the Sacramento River (Corps of Engineers and the Reclamation Board).

Any time one of the development agencies proposes a project, it is the responsibility of the "protection" agencies to react by commenting on the project and attempting to assure that the fishery needs are considered and met. The protection agencies include the Department of Fish and Game, US Fish and Wildlife Service and the National Marine Fisheries Service. Typically, these agencies have been given lower priority than the "development" agencies within state and federal government. This has made it difficult for the fisheries to be given proper consideration when plans are made for development.

In addition to a reactive mode, the fisheries agencies have several proactive responsibilities that relate to *fishery production* and *fishery utilization.*

Fishery production agencies, like the DFG and the United States Fish and Wildlife Service (USFWS), are primarily responsible for fishery management. Unfortunately, the fishery production agencies don't have sole authority over management decisions. Land use regulation, the resource management of streams, riparian corridors and watershed are issues that are affected by a bewildering array of private, county, state, tribal and federal committees and laws. Communication among these groups is critical in order to rebuild the state's anadromous fisheries. In practical terms, this also means that these groups—each with its own vested interests—should be required to include the restoration and enhancement of salmon and steelhead trout production as a vital concern in their management plans.

Department of Fish & Game

Karuk Indians work with spawning King salmon at Camp Creek enhancement facility near the Klamath River.

Some agencies already include this type of coordinated resource planning in their management strategies. Others need to encourage more. Here are a few examples of how coordination efforts could be enhanced using existing practices:

1) The National Forests currently utilize a forest planning process that allows for interagency coordination and development of fisheries management/protection policies that will be in effect on these federal lands for the next ten to fifty years. This opportunity for coordination must be pursued aggressively.
2) Timber harvesting and intensive timber management on private lands have increased the need for coordination with the California Department of Forestry (CDF), county planning departments and the DFG. If critical fish habitat is to be maintained on these private timber lands, coordination must continue or be improved.
3) County planning departments are asked to vote on small hydroelectric developments. These departments should work with the appropriate resource agencies to implement anadromous fishery protection and maintenance policies. This will help assure that salmon and steelhead trout survive the current development rush on important streams.

Fishery utilization agencies also need to augment coordination and communication. These agencies have prime responsibility for various aspects of fishery utilization. They are:

1) The state of California, through the Legislature and the Fish and Game Commission, which handles harvesting restrictions and commercial and recreational fisheries respectively;
2) The Bureau of Indian Affairs, which takes recommendations from tribal governments to establish harvest schedules for sustenance, ceremonial and commercial fishing by Indians;
3) The Pacific Fishery Management Council, which sets overall harvest regulations for commercial and recreational salmon fisheries off the coasts of Washington, Oregon and California under the fishery management plan.

These three agencies work directly with groups representing the commercial troll fishery, ocean sport fishery, Indian fishery and the inland sport fishery. Together, they set limits and schedules, and make decisions regarding the number of fish taken and the amount that should remain as spawning stock.

RECOMMENDATIONS

Communication and coordination must occur with greater regularity between the agencies involved in production and utilization and the user groups. Further, agencies whose activities impact the fisheries must be required by law, if necessary, to work with fisheries management resource agencies and include programs for salmon and steelhead trout as part of their management goals. The Committee is presently reviewing methods that will facilitate these types of relationships. In addition to the National Forest planning process and the county planning efforts previously mentioned, three more areas will be investigated specifically this coming year.

The California Forest Practices Act: This act is continually revised. Riparian corridor and anadromous fishery protection revisions are needed that provide for cooperation and coordination between agencies. The Forest Improvement Program contains funding capabilities for fishery restoration, but the program needs to be further developed and coordinated with other restoration efforts in California.

Resource Conservation Districts: These districts significantly influence the effect of agricultural practices on anadromous fish populations. Coordination of agricultural erosion control measures with the needs of anadromous fishes can assist specific fisheries habitat restoration efforts.

Water Allocation: Decisions on water allocation and diversions do not usually take into account the needs of anadromous fishes. County water districts and state/federal projects need to be aware of restoration efforts in the affected basins. Mitigation measures and projects must be evaluated and coordinated with the agencies responsible for fisheries management.

"When water projects conflict with fishing needs, the fish always lose..."

Bill Sweeney, retired
US Fish & Wildlife
Service

LAWS AND LAW ENFORCEMENT

The kinds of coordination difficulties just described between agencies are often the result of contradictory laws and problems that relate to law enforcement. California codified law is often byzantine and occasionally inconsistent. Interpretation of these laws may also differ from agency to agency. Enforcement of laws may vary due to differences of interpretation or lack of an adequate number of enforcement personnel.

Laws related to fish are passed by the Legislature and Congress. The regulations for implementing these laws are produced by the Fish and Game Commission/DFG, the Pacific Fisheries Management Council/Dept. of Commerce and the Bureau of Indian Affairs/USFWS.

The enforcement of these laws, however, is left to numerous agencies including:

1) California Department of Fish and Game
2) California Department of Water Resources
3) California Department of Forestry
4) California State Water Resources Control Board
5) US Fish and Wildlife Service
6) US Forest Service
7) US Bureau of Reclamation
8) US Army Corps of Engineers
9) US Bureau of Indian Affairs
10) National Marine Fisheries Service

It should be noted that numerous city and county entities provide local ordinances that also relate to the fisheries resources.

The DFG is responsible for enforcement of the Fish and Game Code and sections related to water pollution and stream alteration. The State Water Resources Control Board and regional water boards join in enforcing these and other water laws. There is little doubt that the overlap in jurisdiction between groups with differing interests results in conflicts and leads to differences in interpreting the laws.

Add to this the reality that there are serious shortages of personnel and equipment to enforce laws and regulations. The DFG, for example, does not begin to have enough wardens or vessels to patrol the ocean and enforce fish and wildlife regulations. Nor does the DFG have legal authority to inspect ongoing timber harvests, for example, except as provided for under Section 1603 Stream Crossing permits. The State Water Resources Control Board also lacks personnel to assure that operating requirements listed in licenses and permits are met. (There is one half-time person to monitor and enforce fish bypass flow and other requirements listed in 10,000-11,000 licenses and 2,000-3,000 permits.)

The body of codified law relating to fish, wildlife and water poses many problems. As mentioned in the section on water, California laws regarding water were framed when the state had ample water and fisheries resources; laws, then, were passed to encourage

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Above: Riparian habitat on Coon Creek, Placer County, before illegal streambed alteration occurs. The creek provides spawning habitat for steelhead trout.

Below: A local rice grower was cited for destroying riparian border and spawning habitat.

Note silt and debris in creek.

Department of Fish & Game

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DFG personnel assess illegal junk pile at Tomales Bay.

development. Many of these laws are out of date and no longer address current problems or relate to the present demands on aquatic resources and habitat. One of the problems of utilizing laws that do relate to habitat is that individual impacts on a particular area are looked at in isolation. There is no mechanism available for considering the *cumulative impacts* facing an area or basin.

RECOMMENDATIONS

It is clear that laws need to be scrutinized and updated, with the goal of giving fair treatment to all of our aquatic resources. Laws are needed that encourage incentives to protect and restore habitat. Laws that allow abuses to occur should be eliminated. (For example, incentives for small hydroelectric projects may include big subsidies, which cost taxpayers and allow for overuse or abuse of a resource than can no longer bear development.)

Enforcement officials also believe that more offenders must be prosecuted and that stiffer penalties are needed for breaking the law. Some who wish to defy the law simply factor in fines and penalties as part of the cost of doing business. If these penalties are not a deterrent, the developer can afford to pay them and proceed with the plans. Laws and law enforcement are critical parts of a formula that will enable the restoration of salmon and steelhead trout resources in California. Without strong, clear laws and regulations that protect habitat and punish those who poach or willingly break the law, there can be little hope of preserving and enhancing these valuable resources.

RESEARCH AND DATA COLLECTION

Management strategies for the salmon and steelhead fisheries must be reviewed and altered regularly. Changes in the watershed due to nature or development, climatic variations, disease, etc. clearly affect annual production and harvest plans. Effective management requires constant collection and evaluation of data and investigation of new methods. Sound management strategies rely on reasonable goals, the availability of timely, accurate data and an understanding of the biological system in question.

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A DFG fish habitat specialist demonstrates use of a portable fish screen he developed for salmon and steelhead trout.

RECOMMENDATIONS

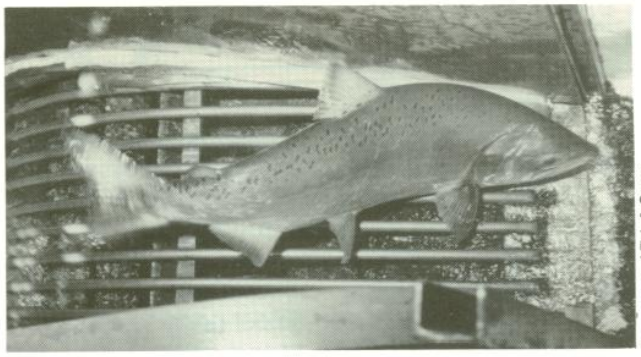
To date, the Committee has found that the body of knowledge needed to improve management is growing; however, at least four times the current investment in research is needed. Coordination between agencies, management and research entities must be improved so that the data collected is pertinent and in a usable form. The development and use of new methodologies must be expanded. Models may be useful, but only as long as they use real life data and relate to real life systems.

The Committee considers the following subjects to be important to anadromous fish and believes they should be given top priority for research:

Evaluation of In-stream Habitat Improvement Structures: The technology for constructing various kinds of structures to enhance different habitats is well-developed. Less is known about the durability of these structures or their effect on fish production. To determine the effect of structures on fishery production, it is first necessary to identify the limiting habitat at all life stages, particularly smolts. Then an evaluation can be made to determine whether the structure is providing the needed habitat or meeting production needs. The best way to evaluate structures is to measure their role in providing habitat on a basin-wide basis.

Methods for Habitat Inventories: Many methods are used to measure and monitor the conditions of habitat in terms of its potential fish productivity. However, the lack of standardization makes it difficult to compare results from different study areas. Important opportunities for comparison are limited or lost. Add to this the fact that there is not enough known about aquatic ecosystems or which variables of the ecosystem merit investigation. Improving inventories may begin with a better understanding of the aquatic ecosystems through long-term studies of fish distribution and habitat. Inventories to assess habitat conditions must also consider watershed processes, such as erosion and changes in runoff characteristics, that may be affected by management activities.

Trends in Fish Populations: Good planning relies on the availability of timely data. Population data needs to be collected and analyzed in more individual basins and in northern California in general. Currently, on north coast streams, only populations of fall chinook (Klamath River) and summer steelhead trout (Middle Fork Eel River) are monitored annually. Annual monitoring of fish populations is needed in the Smith and Eel drainages, and should include coho salmon and steelhead trout as well as chinook salmon. When collected annually, important comparisons can be drawn between escapement and fish production. Also, population trends in one species, such as chinook salmon, do not necessarily reflect parallel



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"Effective management requires constant collection and evaluation of data, as well as investigation of new methods."

King salmon move through trap (left) and holding tubes (below) at the Red Bluff diversion dam on the Sacramento River.

Department of Fish & Game

trends in other species.

Cumulative Impacts: Imagine a stream meandering for miles. At one point, water is diverted for agriculture or added from irrigation. At another, land use practices may alter the riparian border, allowing more soil erosion and causing streambed alteration. The list of uses that cause changes in the stream's water quality and flow could go on and on. Each of these changes has an impact on the stream. When added together, they have cumulative impacts on each other as well as the stream. Many agencies or private interests may use water without necessarily considering all other usages. Cumulative impacts are not always anticipated and are also difficult to measure, but they can add up to trouble for a stream. The cumulative pressures facing a stream system must be monitored more closely. Analyses and management recommendations should be tailored accordingly.

CONSERVATION EDUCATION

As with most environmental issues, cultivating public awareness is critical. In some cases, salmon and steelhead trout habitat has been lost or degraded because the public did not know about or understand the issue. In previous discussions, several areas have been identified that are integrally linked to the future of this valuable resource; however, such plans and goals cannot be easily achieved without strong public interest and support. Such involvement requires an aggressive information and education program. The public must have access to information regarding the status of the resource, the activities that affect it and the essential contributions it makes to California's economy and wildlife legacy.

An effective program must reach both children and adults. Adults must have timely information to change old attitudes or misinformation. Children must be informed so they develop opinions based on reason and can carry with them an interest in, understanding of and concern for this resource.

The Committee has used letters, questionnaires and personal communications to assess education efforts on the subject of salmon and steelhead trout resources. It is no surprise that adults have little access to information; and education programs in today's schools are almost nonexistent. A few innovative teachers conduct activities that might serve as nuclei for future programs. The DFG's Project Wild, a conservation education program endorsed by the Department of Education, now reaches thousands of teachers and may also provide opportunities to reach children.

RECOMMENDATIONS

During 1986, the Committee will investigate approaches for remedying the current lack of information and education regarding salmon and steelhead trout resources. It will develop recommendations for information programs appropriate to school children and the adult public, in general.

Department of Fish & Game

Programs, like the DFG's Project Wild, can be used to help school children understand environmental problems.

SECTION TWO:

Map Legend

1. Smith River, Redwood Creek, Mad River Region
2. Klamath River, Lower Trinity River
3. Trinity River Upstream from Hoopa
4. Mattole River, South Fork Eel River, Lower Eel River, Van Duzen River
5. Upper Eel River
6. Sacramento River System
7. Marin, Sonoma & Mendocino County Coastal Streams
8. Russian River
9. San Francisco Bay Streams
10. San Joaquin River System
11. South Coast Streams

BASIN MANAGEMENT REGIONS & PLANS

INTRODUCTION

This section takes into account another reality investigated by the Committee: California's salmon and steelhead trout habitat is spread throughout several geographically distinct regions of the state. To facilitate planning, the Committee divided the state into eleven (11) geographic areas that will be considered individually (see page 25). Specific basin management plans are being developed. A subcommittee has been or will be formed to study each region or basin, and to seek out local specialists to povide information. Local involvement has been sought to assure that basin management plans have a base of local involvement and support. Several geographic regions are large and complex enough that subbasin plans will be developed.

Smith River
Redwood Creek
Mad River Region

This region includes three major north coast streams—the Smith River, Redwood Creek and the Mad River, as well as numerous smaller coastal streams. Local working groups have been established for each of the three large streams and for Little River and the Humboldt Bay watershed.

The Smith River is located in the extreme northwestern corner of California in Del Norte County. This river begins in the steep, rugged, densely forested mountains of the Siskiyou Crest and eventually winds its way across a broad floodplain to join the sea, just south of the Oregon border. The river drains approximately 725 miles; most of it is within the Six Rivers and Siskiyou National Forests and is managed by the federal government.

Instream habitat conditions have been improved gradually since the disastrous flood of December 1964, but most of the streams are below optimum productivity. Habitat problems include sedimentation, lack of spawning gravel or silted gravels and poor rearing habitat. In recent years, the US Forest Service, the state and private individuals and organizations have been active in fish habitat improvement projects.

Fall run chinook salmon and winter run steelhead trout are the principal anadromous salmonid species in the Smith River. Coho salmon are not found in great numbers in the Smith River, but are known to spawn in several of the tributaries to the lower river. The Smith is also known as the best sea-run cutthroat stream in northern California. Resident rainbow trout and cutthroat trout are found in the headwaters of many streams. Fish population research has not been done for the Smith River in any systematic fashion. The California Department of Fish and Game estimates annual adult production at 45,000 for chinook salmon, 15,000 for coho salmon and 30,000 for steelhead trout.

The Smith River is also known for its scenic beauty, recreational opportunities, outstanding water quality and unusually large salmon and steelhead trout. Portions of the Smith River watershed are in both the state and federal Wild and Scenic Rivers systems. Federal wilderness areas also are located within the watershed.

The Redwood Creek basin is entirely within Humboldt County. The basin includes an area of 280 square miles and the creek's main channel length is approximately 63 miles. The basin is characterized by high relief with steep, unstable slopes and narrow valley bottoms. Intensive logging in the watershed began in the 1950's. By 1978, more than 70% of the basin had been logged. This activity, combined with a series of extreme storms, had a severe impact on fish habitat throughout the basin. Redwood National Park and Prairie Creek State Park manage approximately 35% of the watershed. Most of the remaining land is owned by timber corporations.

Populations of chinook and coho salmon, winter and summer steelhead trout and coastal cutthroat are still present in the Redwood Creek system, but at reduced levels compared to historic population estimates. The county operated Prairie Creek

Fish Hatchery has been in existence on a tributary of Redwood Creek since 1936.

Redwood National Park is implementing a 15 year, $33 million watershed rehabilitation program designed to reduce erosion and sedimentation within the Park. The Park also conducts a sediment monitoring program and an extensive estuarine management program to provide habitat for salmonid summer rearing. Unfortunately, very little watershed restoration work has occurred in the 65% of the basin that is not under Park management.

The Mad River flows northwesterly through 500 square miles of watershed. From its headwaters in Trinity County, it travels almost 100 miles to its mouth at the Pacific Ocean, north of Eureka (Humboldt County). Most of the upper half of the basin is managed by Six Rivers National Forest. Approximately one-third of the watershed is owned by large timber corporations. The remainder is under numerous smaller private ownerships. Forestry is the predominate land use. Livestock grazing and residential development occur over a much smaller area. The Humboldt Bay Municipal Water District's Ruth Reservoir, on the Mad River, stores and controls water which is diverted at a rate of approximately 75 million gallons per day, from a basin at a point 75 miles downstream.

The Mad River has populations of coho and chinook salmon and winter and summer steelhead trout. The state-operated Mad River Fish Hatchery has existed since 1970. The Lower Mad River receives heavy sportfishing pressure due to its proximity to Humboldt County's population center.

Topics to be addressed by the basin working group include habitat restoration, hatchery operations, impacts of gravel extraction, public education and sportfishing management.

The Little River enters the Pacific Ocean south of Trinidad in Humboldt County. The 50 square miles of watershed has seen extensive logging activity and is now primarily forested with mature second growth timber. Livestock grazing occurs along the lower few miles of the stream. Chinook and coho salmon and steelhead and cutthroat all utilize Little River. Habitat in Little River is generally in better condition now than it was 30 years ago; however, excellent opportunities still exist for restoration and enhancement of salmonid populations. The Little River group will be working directly with landowners to protect and restore habitat.

Klamath River
Lower Trinity River

The Klamath River system has three distinct subparts: 1) the upper Klamath River above Klamath Falls, Oregon, including the Lost River; 2) the Klamath River below the falls; and 3) the Lower Trinity River.

The lower Klamath system (subpart 2) consists of the Klamath River below Klamath Falls, the Trinity River and more than 200 smaller tributary streams. For the purposes of management plan development, the Committee has broken the lower Klamath River into two regions: 1) the lower Klamath River and its northern tributaries, as well as the lower stem of the Trinity River (below Hoopa); and 2) the Trinity River above Hoopa. The Trinity River upstream from Hoopa will be discussed in section three.

The Klamath River basin encompasses much of extreme northern California and part of Oregon. Most of Siskiyou county is drained by the Klamath before the river crosses the line into Humboldt county. Here, it picks up the Trinity River and flows north, through a corner of Del Norte County and empties into the ocean near the city of Klamath.

On the basis of physical characteristics and fish fauna, the river system in this region is essentially a large coastal stream. It is a fast-flowing, rock-bottomed, cold "trout stream" over much of its length. The fish fauna is dominated by anadromous fishes including Pacific lamprey, white sturgeon, green sturgeon, eulachon, American shad and coastal cutthroat trout, as well as chinook salmon and steelhead trout. The salmon and trout spend anywhere from a few months to two years in the river before moving out to sea.

Anadromous fish migrations historically

reached Klamath Falls, Oregon; however, the dams that created Copco Lake and Iron Gate Reservoir have since pushed the limit of anadromous penetration considerably downstream into California.

The management plan will focus on those reaches of the system still accessible by migration to anadromous fish. The subcommittee will also examine possibilities of expanding the range back to historic dimensions.

Trinity River Upstream from Hoopa

The Trinity River is located in northwestern coastal California, primarily in Trinity County. The river drains into the Klamath basin approximately 40 miles from the coast. The Upper Trinity River Region, as delineated by the Committee, is a sociological unit starting at the Hoopa Tribe's upstream boundary and extending upriver to the Trinity River's headwaters.

In physical and faunal characteristics, the upper Trinity was very similar historically to the Klamath River region described in the previous section. The Trinity River, however, has its own unique problems, as well as restoration and management requirements that warrant special consideration.

The Trinity River basin is home to fall and spring run chinook salmon, coho salmon and fall/winter and spring runs of steelhead trout. The basin also hosts green sturgeon and possibly a sea run brown trout. The brown trout eat salmon fry and are currently a topic of public controversy.

The spawning and nursery habitat for the anadromous fisheries has been severely degraded since the 1950's. The problem cycle started with the construction of Lewiston Dam. Then, logging and road-building activities, compounded by the flood events of 1964 and 1975, made things worse. The dewatering of the tributaries for agricultural and domestic diversions have contributed to the problem. Today, the Lewiston Dam diverts 86% to 90% of the annual flow of the Trinity River into the Central Valley Water Project. This leaves barely 10% of the flow for the river and the wildlife dependent on it.

The chinook and coho salmon and steelhead trout fisheries have shown a dramatic decline of 90% since the 1950's. Coho salmon populations have also been decimated in the south fork of the Trinity River and in the down river natural spawning areas below the Lewiston Dam. The Lewiston hatchery is now the primary producer of coho in the Trinity River basin. In recent years, however, there have been major set backs in the hatchery production of these fish, primarily due to diseases.

Currently, the Trinity River Basin is the focus of numerous state and federal salmon and steelhead trout restoration and manage-

Bureau of Reclamation

Above: Trinity River at Papoose Creek, before the dam.

Below: An aerial upstream view of the Trinity Dam and Clair Engle Lake.

Bureau of Reclamation

ment efforts. Interagency coordination of salmon and steelhead restoration and management efforts will be a prime focus of this basin management plan. In addition, the subcommittee will seek to identify problems and solutions for habitat degradation and will investigate the issue of effective harvest management.

Mattole River
South Fork Eel River
Lower Eel River
Van Duzen River

This region includes the Mattole River, the South Fork Eel, the lower Eel River and the Eel's tributary—the Van Duzen River.

Most of the region is within Humboldt County; however, the Van Duzen River heads in extreme western Trinity County, and the south fork Eel River heads well into Mendocino County. The Eel River, after receiving the waters of the Van Duzen, reaches the ocean just south of Humboldt Bay. The Mattole River heads in the King Mountain Range and flows for 40 miles before emptying into the ocean just north of Punta Gorda.

The Eel-Mattole work group met several times through the spring of 1985 to devise a strategy for development of a basin management plan. Because of budgetary limitations, nothing concrete has been achieved. The working group's structure has been established and when funding becomes available, plan development can begin in earnest.

Upper Eel River

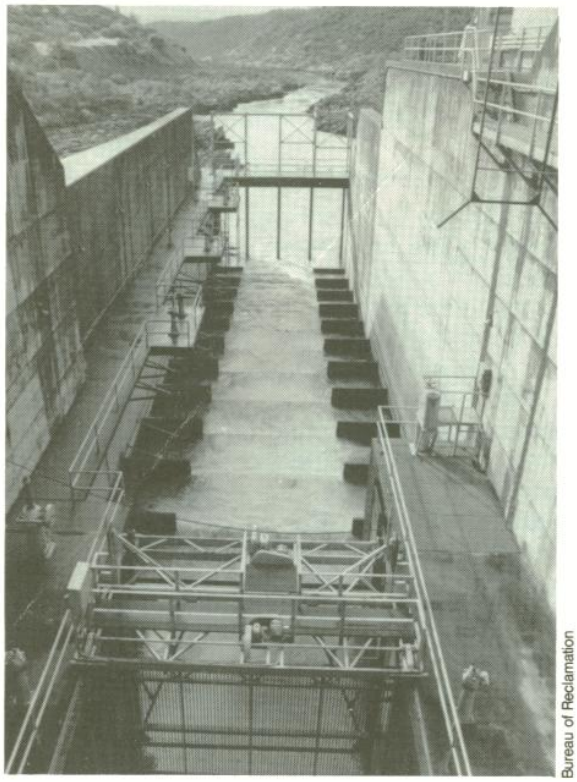
This region includes the Main Eel River above its confluence with the South Fork Eel River, and its tributaries. The Upper Eel River has its headwaters in the counties of Trinity, Glenn, Lake and Mendocino. It flows northward into Humboldt County and is joined by the South Fork Eel River near the redwood tree that has been designated the world's tallest tree. From there, it continues northward, receives the water of the Van Duzen River near Scotia and flows into the ocean just south of Humboldt Bay.

Over the years, logging, overgrazing, road building, water development and diversion have all had adverse effects on the Upper Eel's habitat and its dependent fish populations. The Eel River carries one of the world's highest sediment loads. Successful long-term restoration activities will focus on restoring ground cover and stabilizing soils, slides, gullies and streambanks in headwater areas in an effort to slow the runoff of both water and sediment.

The Upper Eel River produces primarily chinook salmon and steelhead trout. The summer steelhead trout of the middle fork is the region's most unique fish. They enter the Lower Eel in the spring and make their way upstream to the middle fork. Then, they "summer-over" in the deep, cool pools of the middle fork and spawn the following spring. The flood of 1964 filled the middle fork's pools with silt and sediment, resulting in the near loss of the run. A restoration program of the DFG and the US Forest Service has restored the spawning population so it is no longer in danger of extinction.

The Eel River is also noted for large-sized chinook salmon. A restoration project has been planned for the Upper Eel that will restore the entire Tomki Creek watershed. The plan will be to manage it as a "natural hatchery", and produce the good water quality needed to substantially increase populations of Eel River chinook and steelhead. Tomki Creek is a tributary to the Upper Eel River. It enters the Eel River just below a dam that diverts the majority of the flow of the Eel at that point. Tomki Creek provides tributary flows at a vital junction; as such, it is an important factor in maintaining and restoring the Upper Eel's fisheries.

The Upper Eel River subcommittee has had two formal public meetings and has identified many problems facing the region,



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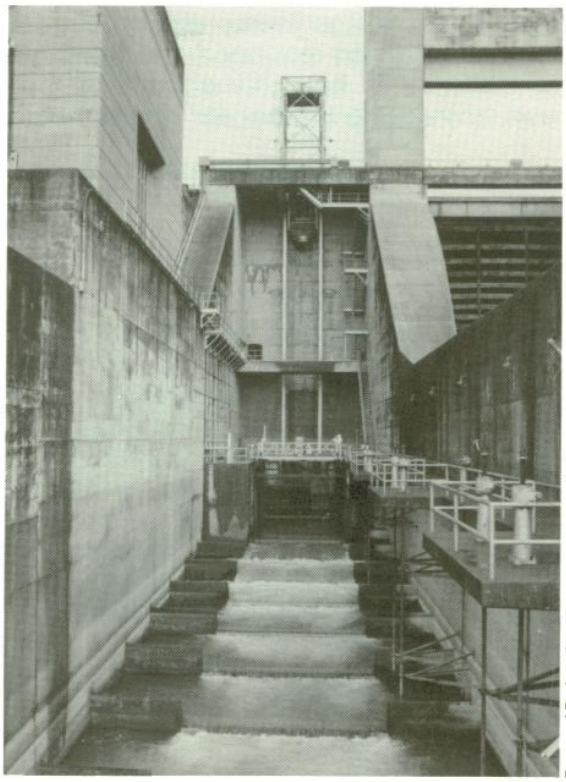

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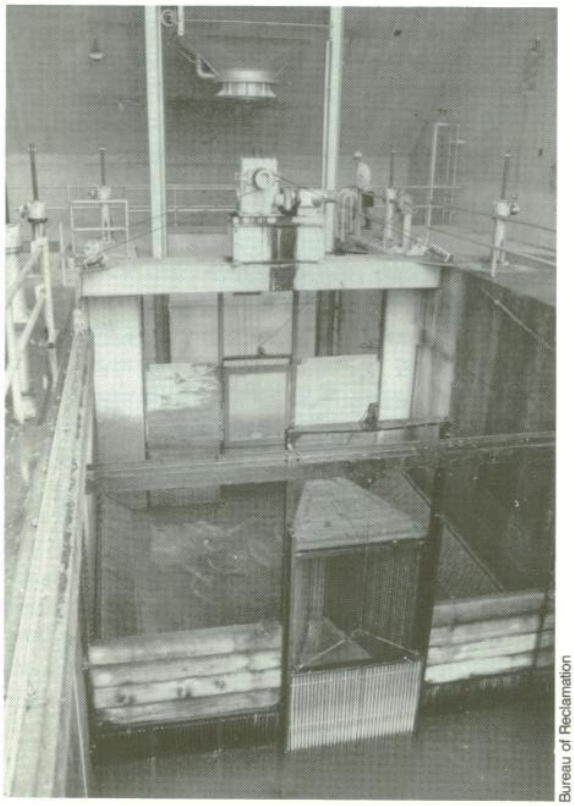


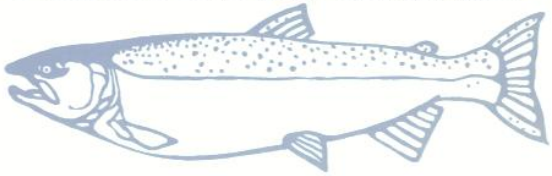
Bureau of Reclamation

Upper left: Looking down the fish ladder at Keswick Dam, near Redding. The Sacramento River can be seen in the background.

Above: Salmon swim up the ladder toward the fish elevator.

Lower left: They congregate in the trap and are lifted from the water.

Below: Finally, the elevator is lowered and the fish are placed in a tanker truck for transport to the Coleman Fish Hatchery.



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as well as potential solutions. The next step will be to identify and examine the most promising solutions and projects. During the discussions, the subcommittee identified three initial areas where legislation is needed. This would involve changing the law to 1) permit the state to enter into agreements with tribal governments to allow for better fisheries management on tribal lands; 2) provide better safeguards for maintaining these fisheries resources; and 3) provide water rights for fish.

Sacramento River System

This region is the largest area for which a plan will be developed. It includes the Sacramento River and all of its tributaries. Most of Shasta, Glenn, Butte, Colusa, Yuba, Sutter, Yolo, Placer, El Dorado and Sacramento counties are included. A variety of habitats are found in this region. Many of its natural essential features are ancient; however, much of the region has been severly modified.

Although current chinook salmon runs are drastically reduced and one run has been petitioned for listing as a threatened species, the Sacramento River supports a large percentage of California's remaining chinook salmon. The majority of the salmon caught commercially and recreationally come from the Sacramento River. The Sacramento River also provides important habitat for steelhead trout and they, too, face many problems.

The "yearling program" is a promising development in the Sacramento drainage. Fish spawned artificially at the Feather River and Mokelumne River facilities are reared to yearling size, then released downstream at points as distant as Vallejo.

This joint venture, funded by the DFG and the commercial trollers (through license fees), has demonstrated that releasing larger fish closer to the ocean can yield greater fish returns than traditional hatchery methods. Problems such as higher rearing costs and the greater tendency of returning adults to stray must be evaluated against these increased adult returns.

It should be noted that the work of the Upper Sacramento Salmon and Steelhead Trout Advisory Committee (appointed by the Director of the DFG) has been invaluable. Their reports have provided much critical information to this committee. In keeping with the practice of utilizing local expertise when possible, the years of information this group has amassed is being used to formulate a basin management plan. Some of their recommendations can be found at the end of this report.

Marin, Sonoma and Mendocino County Coastal Streams

This region includes the numerous small north coastal streams, such as the Navarro, Garcia, Big and Noyo rivers. These streams empty directly into the ocean without first connecting to any of the larger rivers in the area. The north coastal streams are highly variable, cold-flowing and, for the most part, permanent. Most of the streams have a high

California Trout, Inc.

A log jam on Fuller Creek, Sonoma County.

gradient and flow rapidly to the sea; a few of the larger streams, however, meander across flood plains in their lower reaches. There is great seasonal fluctuation in the flow levels, shifting the streams from raging torrents in the spring to slow trickles in the summer.

Most of the streams support their own salmon and steelhead trout runs and have their own peculiar management needs. The anadromous fishes utilize most of the stream habitat, being excluded only from the upstream reaches that are inaccessible to migration. The shallow riffles where the water flows over rock, gravel or sand are used as spawning grounds for salmon and steelhead trout. The young salmon and steelhead trout that survive the spawning and pre-adult stages usually spend a year or two in the pools of their natal stream before migrating to sea. Coho salmon and steelhead trout found in these coastal streams have not been as productive in recent years.

The subcommittee will develop management plans that identify existing problems and seek potential solutions that can help maximize the anadromous potential of these small systems.

Russian River

Historically, the Russian River was one of the finest steelhead streams in the world. New Zealand stocked its own inland streams with our Russian River stock because the fish were so spectacular. The Russian River is a coastal stream that rises in the eastern slope of the Coast Range and flows southward to a junction with Santa Rosa Creek (Sonoma County) before turning westward. Then it flows through a low canyon and empties into the ocean at Jenner, just north of Bodega Head. This river is very accessible to large urban areas; consequently, it is one of California's most important steelhead trout streams.

Water flows in the Russian River, which is nearly dry each summer, have been augmented since 1909 by diversion of the Eel River water by Pacific Gas and Electric Company. Some sustained flows are provided by Coyote Dam on the East Fork of the Russian River. The completion of Warm Springs Dam could provide additional sustained flows to a portion of the lower river; instead, it is likely that flows will be manipulated to provide water for other purposes. The coordinated management of Coyote and Warm Springs Dams could be helpful. The seasonal changes of the Russian River are also affected by the city of Santa Rosa, which uses the Russian River as a sewage line to the ocean. Sewage is supposed to be treated, but from time to time, untreated sewage is pumped directly into the river.

The operation of the new Don Clausen Hatchery at the Warm Springs Dam may help reestablish chinook salmon in this stream and provide additional silver and steelhead trout. The survival of the wild steelhead stock, however, depends on successfully resolving problems caused by the deterioration of habitat in the tributary streams where wild steelhead trout spawn.

Soil erosion, destruction of vegetation cover, the proliferation of summer recreational dams and the many other problems caused by a rapidly growing suburban population and poor land management are subjects being studied by a large citizens' basin subcommittee.

San Francisco Bay Streams

At one time, all of the streams feeding San Francisco Bay hosted healthy populations of salmon and steelhead trout. Remnants of the steelhead trout runs remain in some streams today. This is a unique system as it dries during the summer; as a result, fish there have adapted to a short run season. Native

stocks have a unique life history in that they have developed unusual patterns to accomodate the seasonal flows. Not all of these populations could survive as an urban angling resource; however, some of the bay area streams are large enough to potentially support a "catch and release" urban fishery. In any case, the protection and restoration of all bay area streams is important because they can be invaluable tools for increasing public awareness and appreciation of the resource.

With this goal in mind, the San Francisco Bay streams subcommittee is participating in the development of a cooperative plan to restore Bay Area steelhead trout populations. This is part of a comprehensive effort to protect and restore native streams so important to these anadromous fishes.

Department of Fish & Game

Members of the North Bay Chapter of Trout Unlimited pour concrete during the restoration of a deteriorated fish ladder on Corte Madera Creek, Marin County.

San Joaquin River System

The San Joaquin River System region is nearly as large as the Sacramento system. The region encompasses much of Madera, Merced, Mariposa, Stanislaus, Tuolumne, San Joaquin and Calaveras counties. It includes the San Joaquin River and its numerous tributary streams, among which are the Merced, Tuolumne, Stanislaus, Mokelumne and Consumnes Rivers.

The Kern, Tule, Kaweah and Kings Rivers of the southern end of the San Joaquin Valley join the San Joaquin River only in extremely wet years; these rivers won't be addressed to any great extent by the committee.

Like the Sacramento River, the essential features of the San Joaquin River system are varied and ancient. But to an even greater extent than the Sacramento River, man made changes in the San Joaquin system have greatly reduced the amount of habitat currently available to salmon and steelhead trout. It is sad to note that 100,000 fish that spawned upstream were lost, in a single action, when the Friant Dam was built. Management and restoration of the remaining habitat and fish must be carefully planned and coordinated and will be critical elements of the basin management plan.

South Coast Streams

This region encompasses much of California's coast including the numerous small coastal streams south of San Francisco Bay. The region may be divided into the following groupings: 1) the Monterey Bay group; 2) the south-central coastal group; 3) the Santa Maria/Santa Ynez group; 4) the Los Angeles plain group; and 5) the San Diego group.

Although south coast streams no longer contribute much to the anadromous fish populations, most of the waters once supported steelhead trout runs. Vestigial populations of steelhead and coho salmon remain.

The subcommittee hopes to identify where recovery potential exists and to outline what must be done to facilitate the recovery of these streams.

RECOMMENDATIONS FOR LEGISLATIVE ACTION IN 1986

Many recommendations have been made in this report. Specifically, the Salmon and Steelhead Trout Advisory Committee urges the Joint Committee on Fisheries and Aquaculture to pursue legislation to meet the objectives itemized below.

A) **Coleman National Fish Hatchery**

The Coleman National Fish Hatchery is an important element in the artificial propagation of anadromous fish in California. A resolution is in order commending Congress for appropriating funds of $2.2 million for this hatchery.

B) **Instream needs assessment**

AB 723 was recently signed into law and became effective on January 1, 1986. The legislation, among other things, provides $500,000 to the DFG to develop proposed streamflow requirements pursuant to Section 10002 of the Public Resources Code. In order to meet the intent of the law, the following should be addressed:

1) The DFG will need an annual commitment of $1.9 million in order to undertake the required analysis of ten streams per year. This funding should come from the General Fund, and must be addressed during the budgetary process.
2) It must be impressed on the DFG that the instream needs assessment should be conducted so as to assure that the proposed streamflow requirements allow for maintenance and restoration of the state's fisheries.

C) **Upper Sacramento River**

The Upper Sacramento River is a vital spawning reach for the state's anadromous fishes. Action during last year's budgetary process delayed a proposed comprehensive bank stabilization plan that would have severely disrupted the system. In early November 1985, the USFWS invoked the federal Endangered Species Act to halt the bank stabilization project. In order to assure the proper future management of this river's fishery resources, we encourage passage of legislation to maintain and restore the natural resources of this important river

The following recommendations for this river system have come from the Upper Sacramento River Salmon and Steelhead Trout Advisory Committee. We urge the Legislature to consider and support the activities and findings of this committee. Some of their suggestions are:

1) Efforts must be made to ensure that federal agencies meet their ongoing obligations for fishery restoration at Shasta and Keswick Dams both at the time of construction and in subsequent years.
2) Action must be taken to establish annual "fish flushes" on the Upper Sacramento River. During specified times, water releases from Shasta Dam are increased to correspond to down migrations of fingerlings from Coleman National Fish Hatchery. Continuing State-Federal cooperation is essential in this endeavor.
3) Support should be given to USFWS and DFG instream studies in which the Upper Sacramento Salmon and Steelhead Advisory Committee is participating.
4) Water diversions must be suspended (dam gates opened) from Red Bluff Diversion Dam to the Tehama-Colusa canal system when down migrant fish need the water and agricultural needs are low.

D) **Salmon Stamp Program**

We recommend reauthorization of this program.

E) **SB 400**

We recommend moving forward with implementation of this legislation. The Committee will need additional funds above and beyond the SB 400 appropriation. The amount allocated has provided a good start on the project but an annual appropriation of a comparable amount will

be needed to meet the directive. Also, personnel hiring ceiling restraints that interfere with full implementation of SB 400 should be removed.

F) **Coordinated Operating Agreement**
This agreement between DWR and the Bureau of Reclamation involves coordination between stratified water projects. The COA should include provisions for meeting the needs of fish and wildlife before contracts are issued to deliver water to existing users or to new users.

G) **Salmon/Steelhead Trout Newsletter**
We recommend that the Joint Fisheries and Aquaculture Committee explore interest in publication of a comprehensive, statewide newsletter and the possibility of private or public funding.

H) **"In Celebration of Salmon and Steelhead Trout" Program**
We recommend a high visibility celebration highlighting the contributions of salmon and steelhead trout to California. The Joint Fisheries and Aquaculture Committee should work with appropriate organizations to identify what is necessary to implement this plan. The celebration should probably be centered in Sausalito to maximize media involvement, but should also include other coastal and inland locations.

I) **Legislation to meet the needs of the Committee**
In order for the Committee to meet its legislatively mandated obligations, the following must occur:
1) Funding must be provided for legitimate Committee expenses.
2) Individuals must be appointed to fill remaining open Committee seats.

Since the committee was not wholly constituted during its first year and has not yet received financial support, the following accommodations should be made:
3) The life of the Committee should be extended another 18 months until July 1989, and
4) It should be specified that the next three annual reports shall be submitted by July 1 of each year, beginning with July 1, 1987.

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CONCLUSION

The Salmon and Steelhead Advisory Committee views the current condition of salmon and steelhead trout resources as both a challenge and an opportunity. With public awareness and a new emphasis on our anadromous fisheries, salmon and steelhead trout can now be protected and restored with energy from a growing core of people who are interested in and committed to the preservation, protection, restoration and enhancement of this valuable state resource. Without a doubt, the continued interest and support of the California Legislature is critical and essential to the implemenation of any effective, well-coordinated management program.

"Working on a restoration project is like a message to the fish that we do care. I think a community and its people are measured by their regard for living things. . ."

Leo Cronin
Trout Unlimited, North Bay
Chapter

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