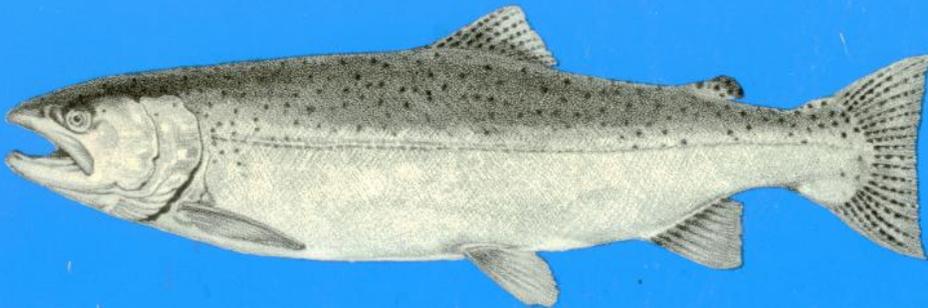
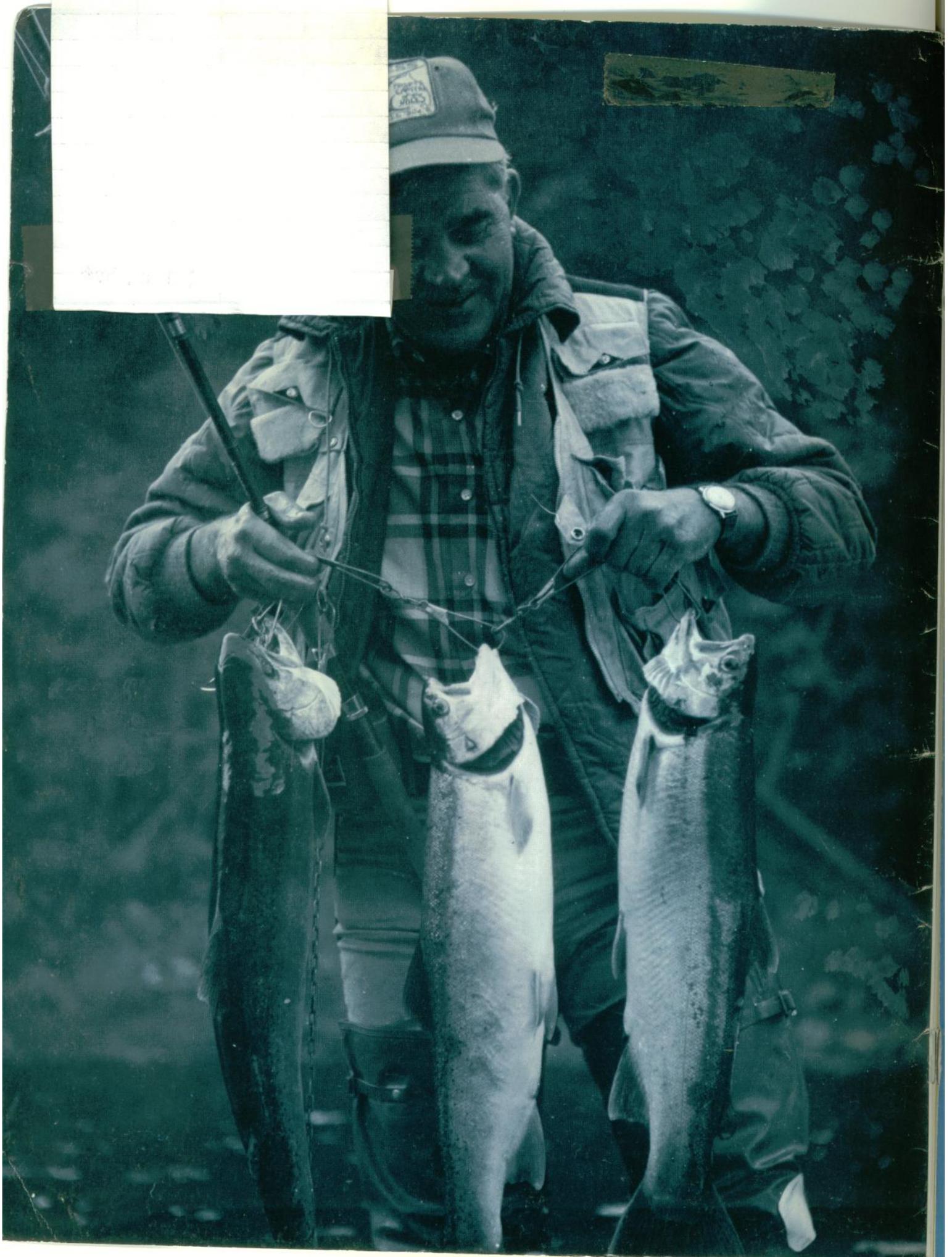


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The Time Is Now!





Report on
California Salmon and Steelhead Trout

The Time Is Now!

Report Authorized by
Assembly Concurrent Resolution #64/1970 Session
State of California

Report Prepared by
Citizens Advisory Committee on Salmon and Steelhead Trout

January 1975

Assembly Concurrent Resolution No. 64

RESOLUTION CHAPTER 124
 ASSEMBLYWOMAN PAULINE DAVIS

*Assembly Concurrent Resolution No. 64 - Relative to creating an
 Advisory Committee on Salmon and Steelhead Trout*

[Filed with Secretary of State July 9, 1970.]

Whereas, The salmon and steelhead trout resources are a priceless and irreplaceable resource of this state; and

Whereas, The survival of these resources is now threatened; now, therefore, be it

Resolved by the Assembly of the State of California, the Senate thereof concurring, As follows:

1. The Director of the Department of Fish and Game shall appoint an Advisory Committee on Salmon and Steelhead Trout which shall ascertain, study and analyze all facts relating to the preservation, protection, restoration and enhancement of salmon and steelhead trout resources of this state, including, but not limited to, the operation, effect, administration, enforcement and needed revision of any and all laws in any way bearing upon or relating to the subject of this resolution, and to report thereon to the director, who shall submit such report to the Legislature, including in the report its recommendations for appropriate legislation.

2. The Advisory Committee on Salmon and Steelhead Trout shall consist of persons having practical knowledge and experience from the following fields:

(a) Four commercial representatives from salmon fishermen and commercial salmon processors.

(b) Four organized sportsmen representatives from salmon and steelhead fishermen and party boat operators.

(c) One public member.

3. The advisory committee shall cooperate with and secure the cooperation of county, city, city and county, and other local law enforcement agencies in investigating any matter within the scope of this resolution.

4. The members of the advisory committee shall serve without compensation.

5. The advisory committee shall study and investigate all relevant matters, in order to provide for and develop a program for the preservation, protection, restoration, and enhancement of the salmon and steelhead trout resources of this state, including, but not limited to, the following matters:

(a) The conduct of hatchery and stocking operations such as to achieve maximum contribution to the fishery and to spawning escapement.

(b) The rehabilitation, protection, enhancement, and preservation of all salmon and steelhead trout spawning areas and the maintenance of such areas in optimum condition.

(c) The expansion of hatchery and related artificial propagation facilities where necessary and feasible to achieve maximum production of salmon and steelhead trout.

(d) The screening of all existing major diversions on salmon and steelhead trout streams.

(e) The development and conduct of rehabilitation, enhancement, the restocking programs to achieve maximum production in all streams with historic populations of salmon and steelhead trout.

(f) The coordination of state programs and activities with federal agencies so as to promote maximum contribution to the salmon and steelhead trout resources by the federal government.

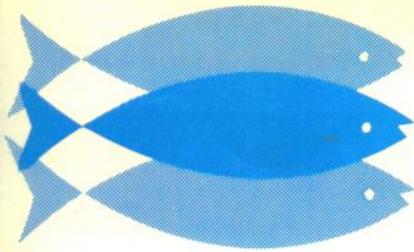
6. The advisory committee shall submit a progress report, together with any suggested legislation, to the director, who shall submit such report to the Legislature not later than the fifth calendar day of the 1971 Regular Session of the Legislature.



IN MEMORY
George Difani
Joseph Paul

Letter of Transmittal





ADVISORY COMMITTEE ON SALMON & STEELHEAD TROUT / 1416 - 9TH ST. / SACRAMENTO, CA. 95814

January 1975

Mr. G. Ray Arnett, Director
California Department of Fish and Game
1416 Ninth Street
Sacramento, California 95814

Dear Director Arnett:

Pursuant to ACR64 (1970) by Assemblywoman Pauline Davis, it is a pleasure to submit to you for transmittal to the California Legislature, the third report of your Advisory Committee on Salmon and Steelhead Trout.

The Committee is gratified by the response of the United States Congress, the California Legislature, the Department, and Governor Reagan to its recommendations. Many important measures to correct identified problems have been passed and signed into law. Public reaction has also been heartening.

The third report treats some specific problems that require immediate attention as well as the remaining major problems that will demand long-range programs to correct.

We appreciate the understanding and concern with which the Legislature has received the first two reports and the support that Paul Jensen and your staff have provided to the Committee.

Sincerely,

W. F. Grader, Chairman
Salmon and Steelhead
Advisory Committee

WFG/slb



The Advisory Committee

ADVISORY COMMITTEE ON SALMON AND STEELHEAD TROUT

Appointed by the Director of the California
Department of Fish and Game
Pursuant to ACR/64, 1970

Committee:

WILLIAM F. GRADER
Chairman of Committee
Commercial Representative

VERNON J. SMITH
Vice-Chairman
Sportsmen Representative

EARL CARPENTER
Commercial Representative

MARIO F. ALIOTO
Commercial Representative

JOHN PELNAR
Sportsmen Representative

EDMUND KOHLHAUF
Sportsmen Representative

WILLIAM HILL
Sportsmen Representative

RICHARD L. HUBBARD
Sportsmen Representative

Advisors:

RAY E. WELSH
President, Salmon Unlimited

PAUL McKEEHAN
Sportsmen Representative

JOHN GREENWOOD
Commercial Fisherman

AUGUST AVILA
Supervisor, Mendocino County

CHARLES COOLEY
Sportsmen Representative

RUDY URBANI
Commercial Fisherman

ED HAGUE
Sportsmen Representative

HERBERT L. JOSEPH, M.D.
Sportsmen Representative

WILLIAM MAAHS
Commercial Fisherman

SAM MITCHELL
Former Supervisor, Humboldt County

JOSEPH PATTON
Water Engineer

MARTIN SELDEN
Sportsmen Representative

CHARLES BOHRMANN
Sportsmen Representative

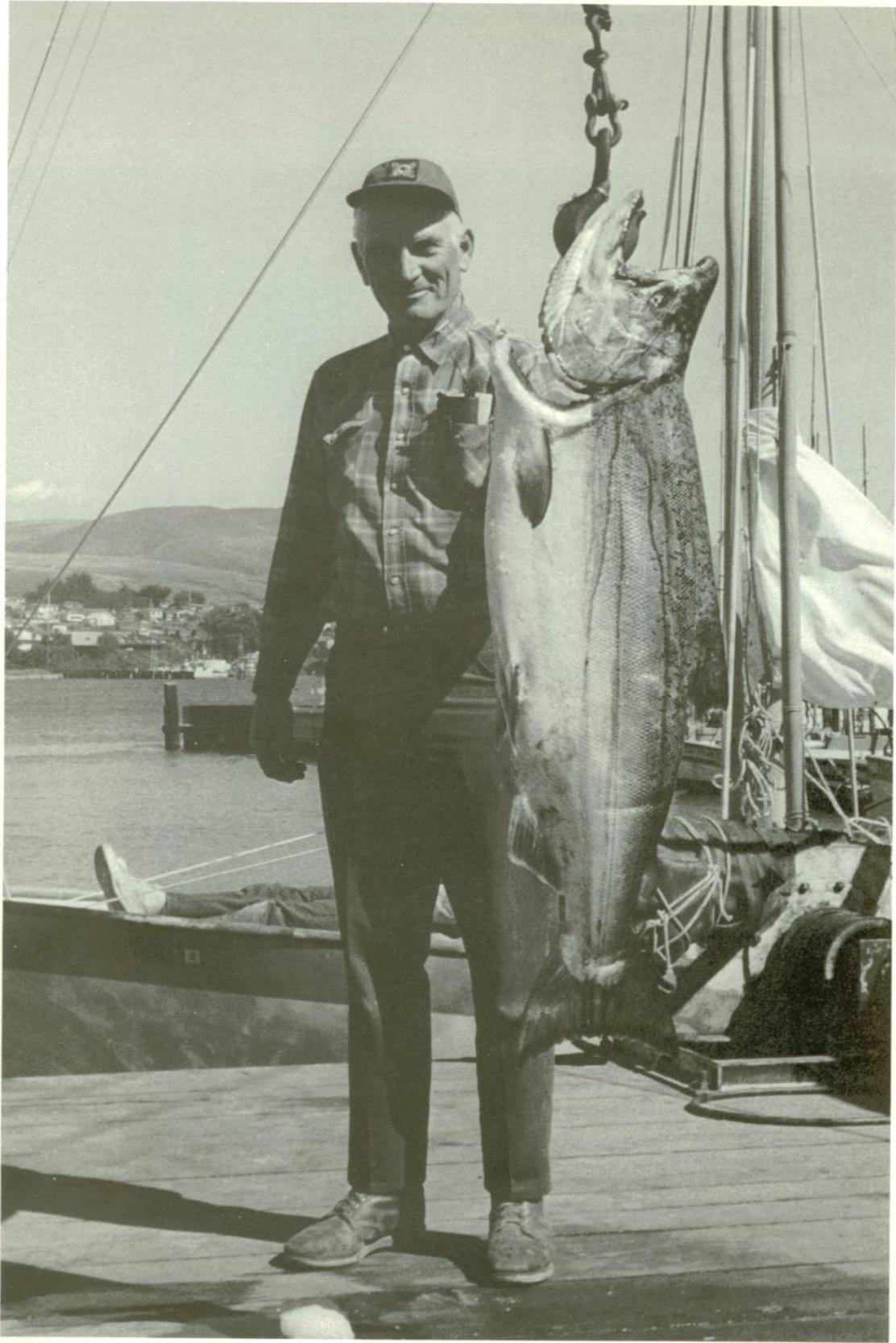
HAROLD AMES
Commercial Fisherman

Committee Consultants:

ENVIRONMENTAL ASSESSMENT
AND RESOURCE PLANNING
Sacramento

Design Consultant:

GEORGE JOW, Designer
Sacramento





California Department of Fish and Game

G. RAY ARNETT
Director

E. C. "CHARLIE" FULLERTON
Deputy Director

JAMES S. LIEBY
Chief of Operations

PAUL T. JENSEN
Chief, Anadromous Fisheries Branch

JACK B. ROBINSON
Senior Fishery Biologist

THE TIME IS NOW!

Land-Use Planning

Help From Local Government

ACR#64/1970 SESSION

Off-Stream Rearing Ponds

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Introduction

For over a century, California's natural resources have been exploited with little regard for effective conservation. Salmon and steelhead populations, like other resources, suffered. The gradual destruction of fisheries habitat in the name of progress was not dramatic enough to stimulate public indignation. Today, however, an aroused public is demanding that our fragile environment and its resources be protected and restored. Progress has been slow because the damage has been severe, and corrective measures are costly. We cannot condone a token investment in protection and rehabilitation programs. In the case of salmon and steelhead, our goal should be full mitigation for past resource damage. By this we mean the restoration of the runs to the full carrying capacity of our rivers and streams. If this objective is to be achieved, problems must be defined, solutions developed, funds made available for implementation, and, where applicable, new legislation enacted. The purpose of this report then, is to point out some of the critical salmon and steelhead problems and suggest action that should be taken **now**.



Salmon are Important as a Food Resource



Status Of The Resources

King salmon spawning runs into California's Central Valley numbered 162,000 and 288,000 fish in 1972 and 1973, respectively. While the 1972 run was cause for concern, some spectacular increases were achieved in 1973. For example, the 96,000 fish spawning in the American River exceeded by half again the previous observed record. A good share of this increase may be the result of releasing hatchery-produced juveniles at downriver locations, which enhances survival but at the same time induces straying among returning adults.

Spawning runs into the San Joaquin River tributaries, included in the above totals, presented a much less favorable picture. From a recent high of 40,000 spawners in 1971, runs declined to 15,000 fish in 1972, and again to 8,000 in 1973.

The Department of Fish and Game has established a relationship between streamflow and salmon survival which indicates that adult runs are, to large extent, controlled by spring outflows when juvenile fish are migrating to sea. Increased spring outflow results in increased adult runs two and one-half years later, when the juveniles affected by such flows return to spawn.

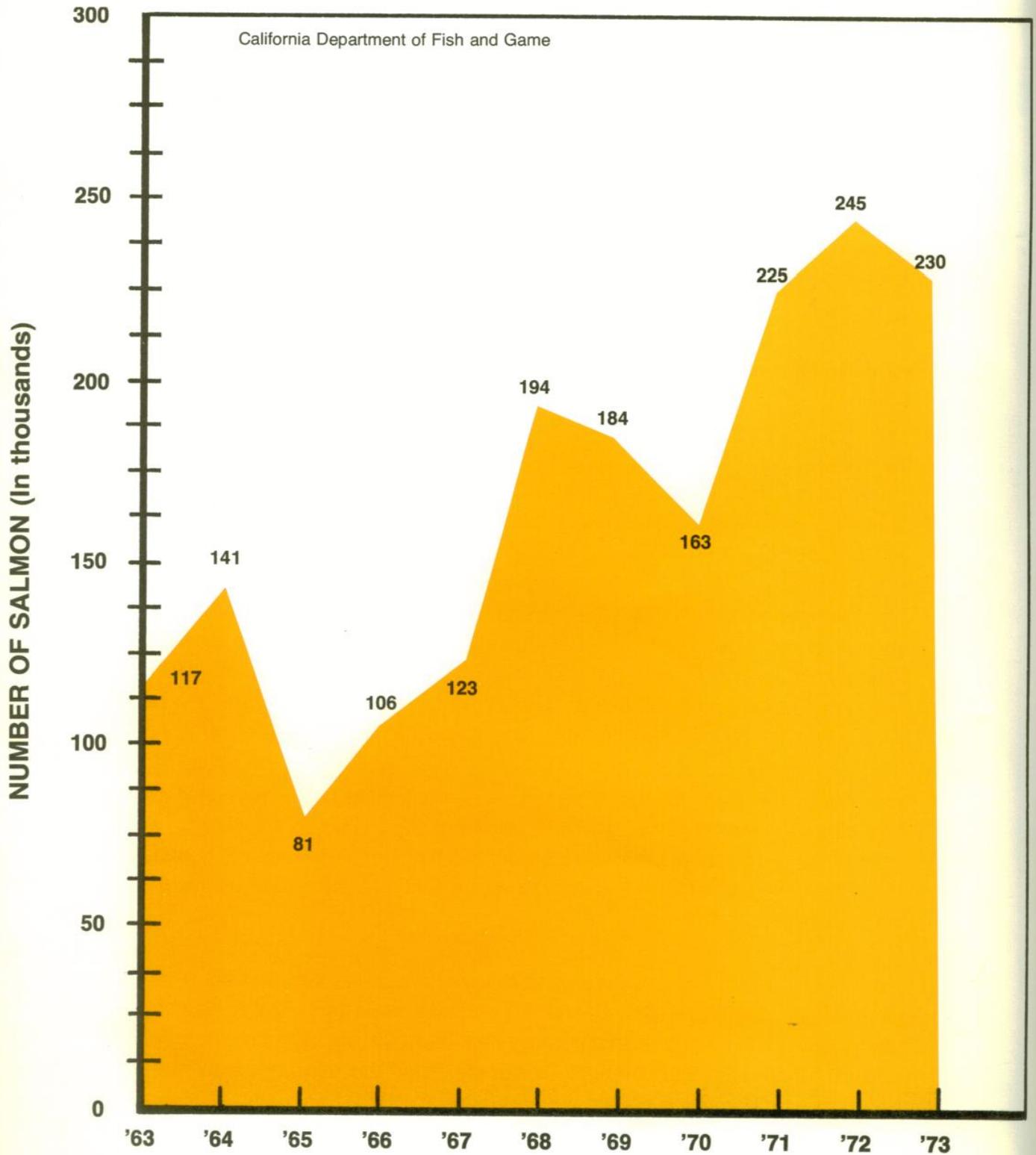
Since all three San Joaquin tributaries are subject to large-scale irrigation diversion, increased runs can generally be anticipated only following wet years when substantial uncontrolled spring outflow occurs. This will continue to be the case unless increased spring outflow can be provided from existing water supplies.

Increases in North Coast salmon and steelhead runs were observed in 1973 at almost all counting stations. Over 8,000 silvers returned to Trinity Hatchery, exceeding the previous record year by almost 5,000 fish. The steelhead picture at Trinity remains dismal. Runs numbering in the hundreds continue to return to a facility which should support 8,000 to 10,000 annually. This situation will be treated in detail later in this report.

California Ocean Salmon Landings

SPORT LANDINGS OF SALMON

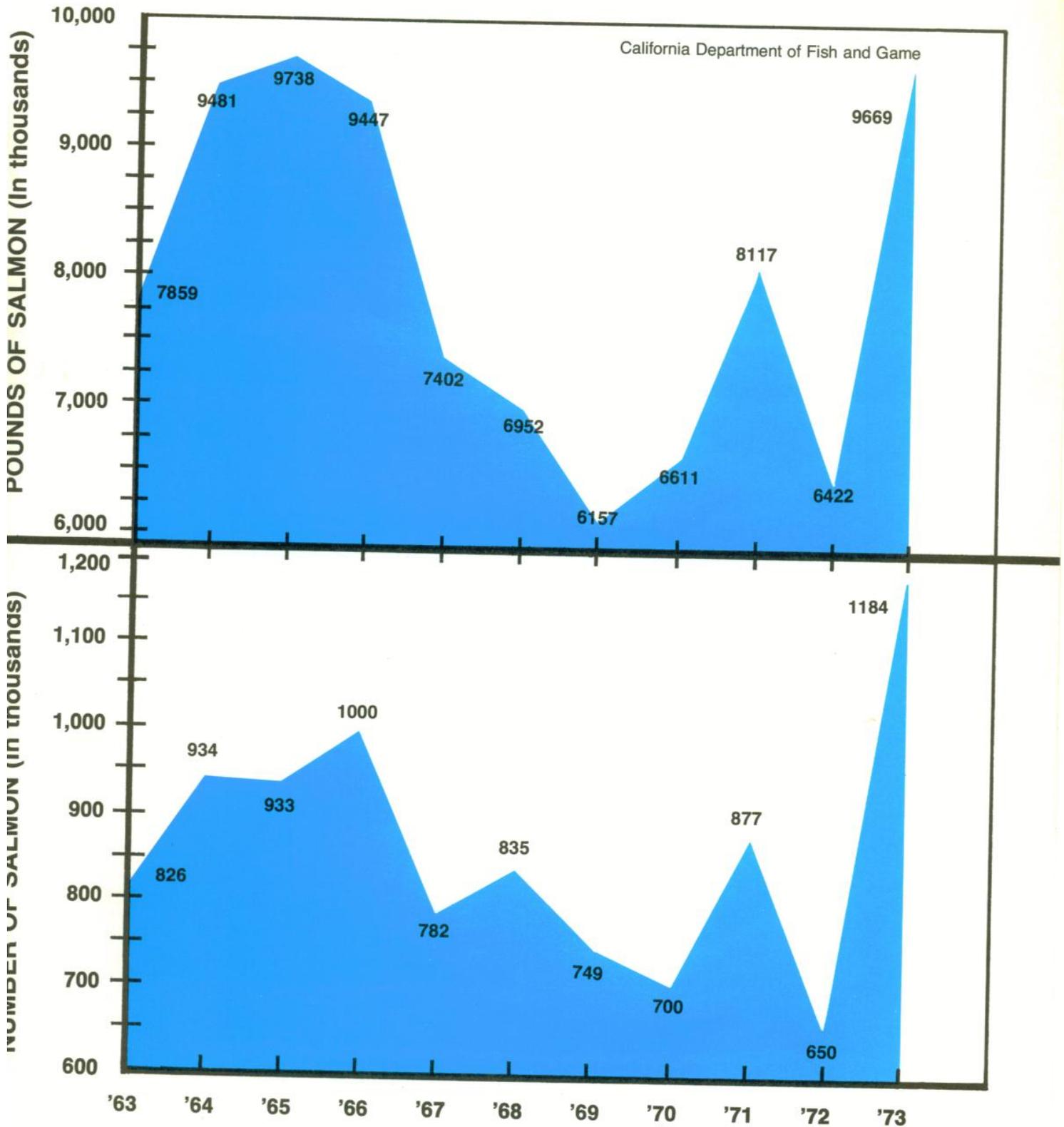
(numbers)



California Ocean Salmon Landings

COMMERCIAL LANDINGS OF SALMON

(numbers and weight)





Trinity High School Students Protesting Degradation of the Trinity River Fishery

Status Of The Resources (continued)

Almost 3,000 adult winter-steelhead returned to Mad River Hatchery from yearlings released in 1972. This hatchery is a production rather than a mitigation facility, and the return of fish in these numbers is a demonstration of the contribution that artificial production can make to anadromous fish populations.

Ocean fishery landings of salmon in 1973 were the best achieved since 1966. Ocean sport landings of 230,000 fish were the third highest on record, and the commercial catch exceeded 9 million pounds, over 7 million of which were king salmon.

It is apparent that proper stewardship of our salmon and steelhead populations can maintain and increase their value as sources of food and recreation. As the following pages demonstrate, our stewardship of these resources can certainly be improved — we have but to recognize our obligation to provide that improvement.



The Time Is Now!

Artificial Propagation

The role of artificial propagation in salmon and steelhead management is becoming increasingly significant in California as natural spawning and nursery areas are degraded or lost. Man's insatiable thirst has justified water development projects which have inundated or isolated historical spawning and rearing areas and reduced flows in many streams. Other spawning streams are no longer productive, reflecting the abuses inflicted on watersheds.

This Committee does not suggest that hatcheries and spawning channels are adequate substitutes for natural spawning habitat, but they do afford a means of attempting to mitigate its loss. Therefore, they must be planned and operated as efficiently as possible.

Although the existing federal and state salmon and steelhead hatcheries produce juvenile salmon and steelhead at a fairly reasonable cost, the present level of hatchery production and the quality of the fish could and should be improved. This can be done by adequate staffing, modernization and expansion of facilities and timely research. Such improvements would lower the cost per pound of fish produced and increase the contributions to both the catch and spawning runs — more than justifying the investment. Those benefitting from water development are clearly obligated to provide funds for maintaining and improving runs affected by their projects.

Research is needed to improve hatchery techniques with a goal of reducing the high mortality which occurs during the first three months after the eggs hatch. Marking experiments must be continued and expanded to evaluate the results of various hatchery procedures and products. More information is also needed on the impact of hatchery production on native salmon and steelhead stocks. Study results should be analyzed without delay and the information made available to all hatchery managers.



Preparing Salmon for Artificial Spawning



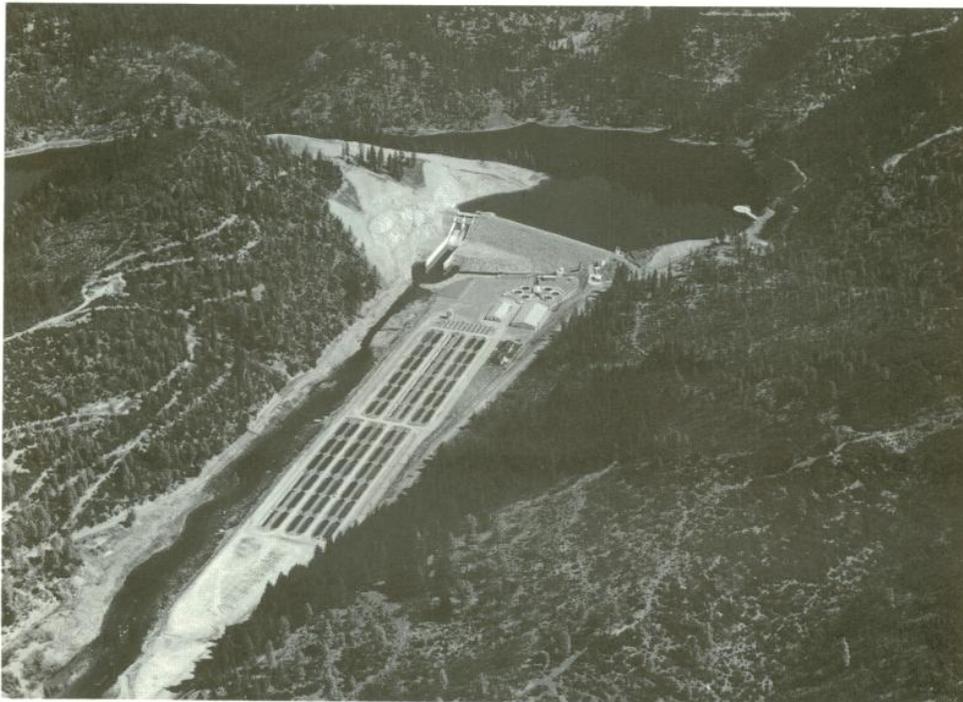
Fertilizing Steelhead Eggs

Artificial Propagation (continued)

Long overdue is the modernization of hatchery facilities to reduce losses from disease and predation and to provide for the rearing of fish to recommended sizes for planting. During the winter of 1973-74, seven million salmon fingerlings succumbed from the Sacramento River Chinook Disease (S.R.C.D.) at Nimbus Hatchery. A tragedy of this magnitude might never have occurred if the Bureau of Reclamation had heeded the Committee's 1971 recommendation calling for a temperature controlled water system at Nimbus.

The Committee is concerned about the operation of the Tehama-Colusa spawning channel including the problem of pre-spawning loss of female salmon. If this channel is to show some tangible benefit for the significant cost of the facility, overall efficiency must be improved.

Maximizing the output of juvenile salmon and steelhead from hatcheries and artificial and natural spawning areas will result in a greater outmigration to the sea. However, the highest use of our salmon and steelhead populations occurs after these fish have achieved increased size through ocean growth. Therefore, the Committee recommends that angling regulations and management programs be designed to enhance adult salmon and steelhead populations.

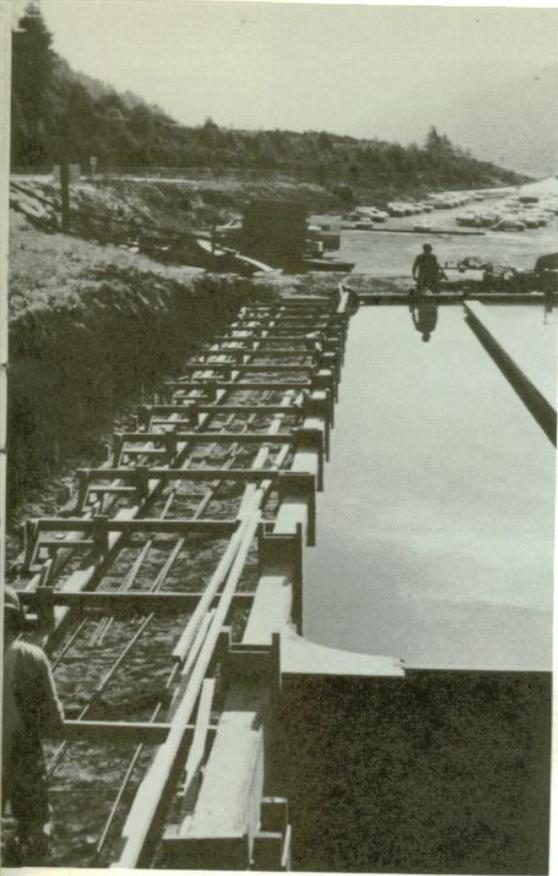


View of Lewiston Dam and Trinity River Fish Hatchery

Off-Stream Rearing Ponds

Hatchery production of steelhead and silver salmon fingerlings frequently exceeds the number which can be reared to yearling size in existing facilities. As a result, the excess fingerlings are thinned out and planted as soon as the hatchery rearing ponds become crowded. *This amounts to a tragic waste of fish,* for it is well documented that planting hatchery-produced fingerling steelhead and silver salmon gives little, if any, return. Developing capacities to raise these surplus fingerlings to yearling size before planting would make a significant contribution to the fishery. Funds to increase the number of hatchery rearing ponds would help, but inadequate water supplies and/or space problems place a practical limit on hatchery expansion.

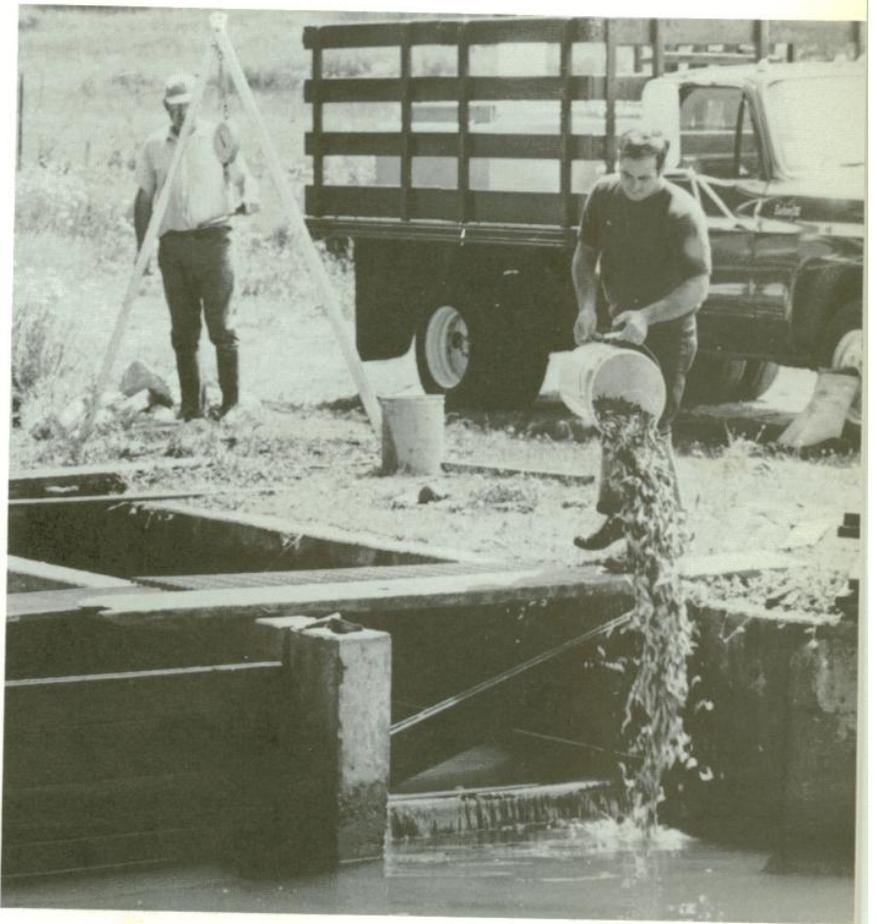
Off-stream rearing ponds afford one promising solution to the problem of providing additional rearing facilities. A few such ponds already exist, others could be constructed at suitable locations. Since coastal communities, conservation organizations and industry are keenly interested in fish rearing programs, they offer a potential source of pond sites, water supplies, materials and labor at no cost to the State. Technical service for a rearing pond program is available from the Department of Fish and Game. We recommend that allotments of fish be restricted to ponds that meet Department of Fish and Game criteria.



**Private Rearing Pond
Construction**



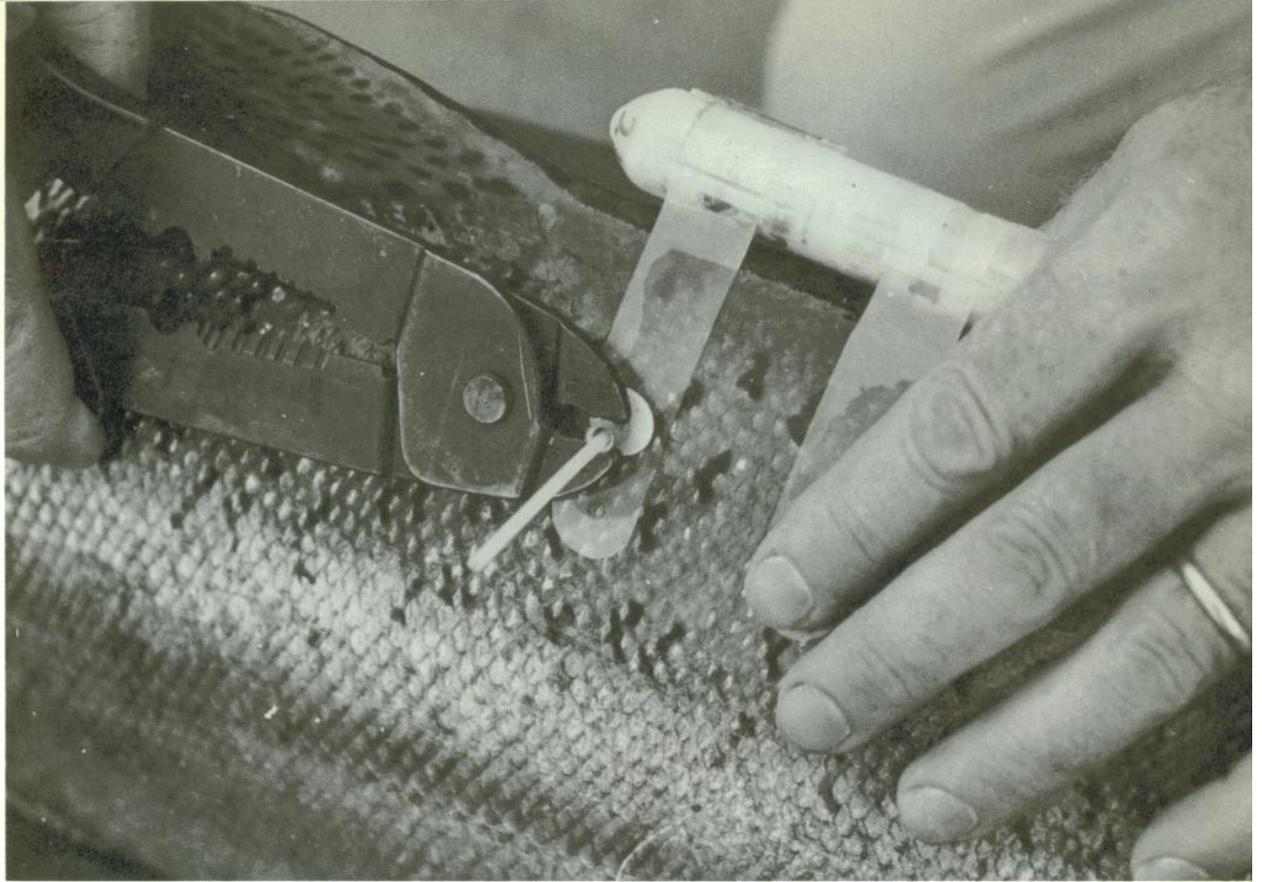
Stocking Silver Salmon Fingerlings in Private Rearing Ponds



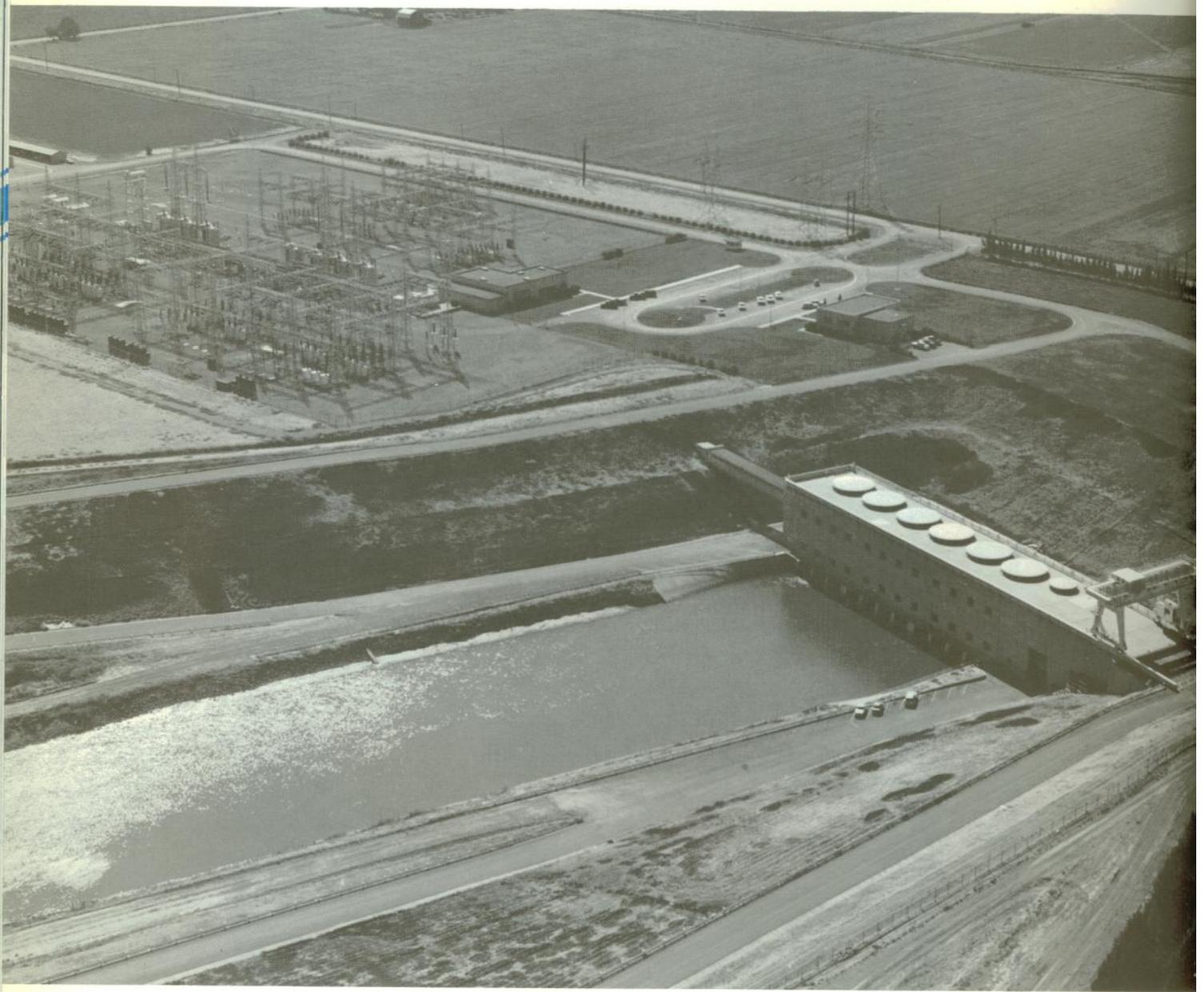
Delta Water Problems

Fishery problems and opportunities associated with water export from the Delta by the federal Central Valley Project and the State Water Project were identified by the Salmon and Steelhead Advisory Committee in its report of May 1972. The Committee recognizes that a joint federal-state Peripheral Canal could solve some existing problems such as flow reversal in the San Joaquin River, but other problems might remain unsolved and new ones created. Much depends on how the total system is operated and upon the development and construction of satellite facilities.

One of the most pressing needs is for a fish screen design for the Hood intake which will guarantee the protection of juvenile anadromous fish. Since 90 percent of all seaward migrant salmon and almost all the juvenile shad and yearling steelhead from the Sacramento-San Joaquin system come from the Sacramento River and must pass this intake, an effective screen is vital to the preservation of the runs. Biologists and engineers have known since the inception of the Delta Fish and Wildlife Protection Study over ten years ago that developing a reliable screen posed difficulties. The Bureau of Reclamation especially has shown little interest in the fish screen problem. Now, with a decision on Peripheral Canal construction imminent, screen design and evaluation must receive extraordinary attention by the most qualified experts. Substantial funding will be required for a crash program.



Sonic Tagging Procedures



Tracy Pumping Plant

Delta Water Problems (continued)

Flows required past the Peripheral Canal intake for the successful downstream migration of juvenile salmon and steelhead must also receive attention. Obviously, firm schedules cannot be established at this time since there is no way to manipulate flows below the intake for study purposes until the canal is in operation. However, an investigation of the rates of downstream movement of salmon and steelhead migrants under present flow and water export conditions should begin immediately. The results of this study would provide a sound basis for testing flow schedules after the canal is completed. If additional water is needed, the threat of water storage and export projects on the North Coast becomes very real. This Committee is convinced that such projects may spell the doom of the salmon and steelhead populations in the streams involved. Therefore, we are inalterably opposed to additional water development in the North Coast area that would adversely affect the anadromous fishery.

The Committee is also concerned about the danger of attracting fall run Sacramento River salmon to Peripheral Canal water release structures in the San Joaquin Delta. The most serious problem can be expected in the main San Joaquin Channel and Old River where fall releases of Sacramento River water are planned for water quality control. It is not possible to estimate accurately how many salmon may stray from their normal migration routes into a dead end situation at the release structures. But those that do will die without spawning unless the problem is recognized and an action plan developed. Such a loss cannot be tolerated!

Releasing San Joaquin water rather than Sacramento water into the South Delta is the most obvious solution to the straying problem. The water development agencies need to take a new look at the possibilities of developing alternate sources of San Joaquin water before embarking on a less satisfactory solution such as the construction of fish salvage facilities at the release sites.

Another problem associated with the Peripheral Canal involves future operations of the existing Delta Cross Channel. This facility, which conveys Sacramento River water to the Mokelumne River System, could become a trap or bottleneck for migratory fish. The opening and closing of the channel gates must be scheduled to avoid interference with salmon and steelhead runs.

Water Projects Operations

Federal, State and local projects have been planned and constructed with no provision for post-project evaluation and modification. With projects in operation, unanticipated problems have played havoc with salmon and steelhead populations. Flow schedules have not met the needs of fish, water temperatures have been too warm or too cold, and mitigation hatcheries and fish facilities have proved inadequate. Drastic changes in historical flow regimens have permitted the encroachment of vegetation on spawning and food-producing areas, and these areas have been further degraded by sediment deposition. In addition to the effects of a reduced fish population on angling success, persistent turbidity caused by some projects has limited angling opportunity.

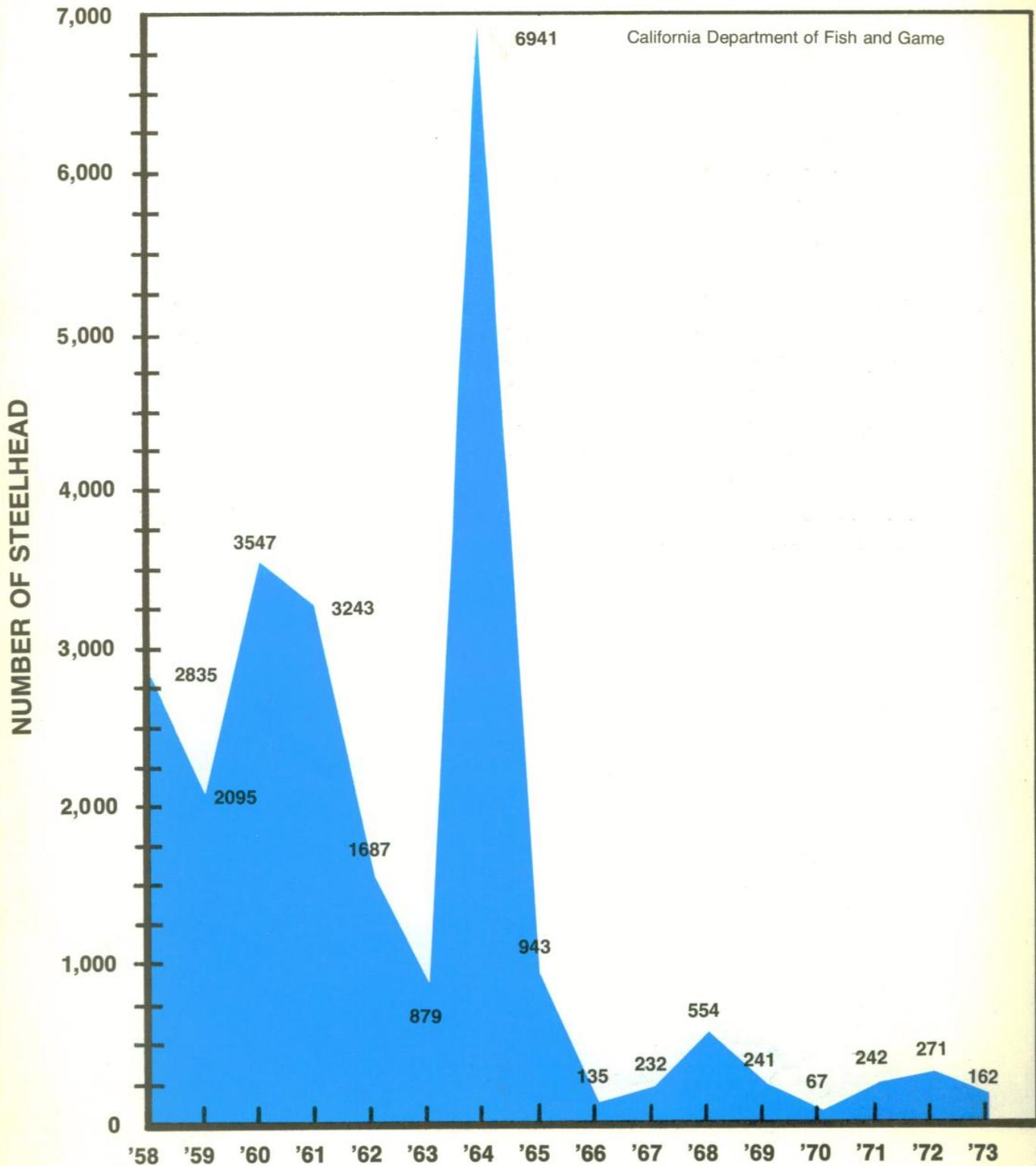
Once projects are completed, it is difficult to obtain funds for evaluation studies — much less to solve the obvious fishery problems. The Federal Bureau of Reclamation's Trinity River Project is a prime example of a water development which has caused tremendous damage to a fishery, yet at the federal level no serious attempt has been made to identify and correct the problems even after the California State Legislature memorialized Congress to do so.

In 1971, the Salmon and Steelhead Advisory Committee Report included the following: "Immediate priority should be given to an evaluation of the U.S. Bureau of Reclamation's Trinity River Project and correction of the tremendous damage done to the steelhead-salmon runs in the river in the last ten years. Steelhead runs under project controlled downstream spring flows have declined 82 percent." Now, three years later, nothing significant has been done to improve the runs. We again urge that this problem be attacked aggressively.

**View of Trinity River Downstream from Trinity Project Showing
Vegetation Encroachment Caused by Low Flow Conditions**



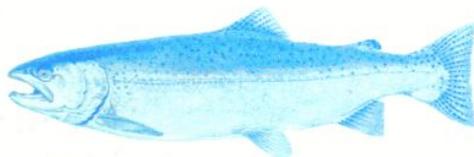
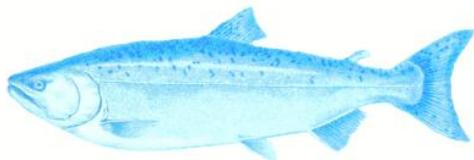
SIZE OF STEELHEAD RUNS TRINITY RIVER AT LEWISTON



Water Projects Operations (continued)

Our 1971 report also recommended that the Bureau of Reclamation repair and modify the Keswick Dam Fish Trap so that it would function efficiently. While it may not be necessary to trap and remove salmon at the dam during flood conditions, at least the trap should operate at all flows up to 30,000 cfs. Again, this recommendation has gone unheeded.

The State Department of Water Resources has demonstrated leadership by supporting post-project studies and correcting deficiencies in connection with the Oroville Project on the Feather River. This agency has funded an eight-year study to determine a suitable flow schedule for the river and implemented emergency measures to correct water temperature and disease problems at the Feather River Hatchery. This is a start in the right direction, however, it must be made mandatory for all water development agencies to assume continuing responsibility for the maintenance and enhancement of fish and wildlife for the life of the project including the funding of evaluation studies and any necessary project modifications. Water permits issued by the state should include provisions for such follow-up evaluation and modifications.





Keswick Dam and Powerplant on the Sacramento River



**Glenn-Colusa Fish Screen Installation
on the Sacramento River**

Land-Use Planning

The natural resources of the North Coast are as diverse as the demands on these resources. The complexity of this natural system coupled with the complexity of public demands requires exceedingly complicated management decisions. Land-use planning regulates the development and utilization of these natural resources in those areas that affect salmon and steelhead habitats. "Good" decisions are needed to regulate the land uses that conform to the capabilities of the land, while giving careful consideration to the balance of many ecological, social and economic decision-making factors that are involved.

Decision makers cannot make "good" land-use planning decisions unless they have adequate facts and the ability to digest these facts into a form useful for decision-making. Neither the complexity of the natural system nor the conflicts in demand are going to lessen. The time to develop the capacity for good land-use planning is now.

Improving the capacity of streams to produce anadromous fish requires the reduction of sedimentation impacts upon fish habitats as well as further watershed and water quality protection. What do the decision makers need to accomplish this task?

Decision makers need a land classification system of environmental information for the North Coast area. This system identifies and characterizes certain components of a specific environment to be used as a base for better land-use planning. Components such as soils, vegetation, and geologic conditions need to be classified in order to help recognize sensitive or hazard areas that are increasing sediment yield in anadromous fish streams.



The Department of Fish and Game is facing a severe financial problem. This has resulted from increased Department of Fish and Game involvement into programs of special concern not just to the hunter and fisherman, but to the general public as well. It is essential that some way be found to provide general fund support for these activities.



**Poor Road Construction and Improper Logging Practices
Contribute Sediment to Anadromous Fish Streams**

Land-Use Planning (continued)

The cooperative State-Federal Soil Vegetation Survey has made a fine start in mapping the soils and their productive potential for about fifty percent of the North Coast area. This effort needs to be expanded to include other critical factors important for sediment control and to complete the job for the entire North Coast.

Decision makers need better information regarding the relationships between fish resources and their habitats. This includes information dealing with fish production levels and their relationship to stream sediment types and amounts. More complete records of fish run sizes are needed for the various drainages. One should also know the importance of various reaches of stream systems to the various life stages of anadromous fish. This points to the need of an anadromous fish stream classification system for proper stream and fish management programs. This would include management policies establishing stocking guidelines in streams that maintain native fish populations.

Decision makers need to know the effects of various levels of sediment input, and its resulting stream turbidity, on angling success. The value of the North Coast sport fisheries is dependent upon the presence of fish and the fishability of the streams.

In order to rehabilitate degraded stream habitats, decision makers need to know the engineering and economic feasibility of reducing sediment yields through engineering practices, cover plantings, and reconversion of grassland to timber.

Decision makers need an accurate continuing record of sediment input into individual stream systems in order to reevaluate and modify land-use planning decisions. This will require a sizable monitoring and study program for each drainage area. In addition, facts are needed to determine the capacity of streams to transport sediment and their capacity to cleanse themselves once deposition has occurred.

Decision makers need to accurately define habitat alterations that occur subsequent to logging operations. This is required to predict possible habitat damage on other watersheds following such operations and to avoid or modify harvesting practices where resulting damage is excessive. Extensive studies are needed in developing and improving timber harvesting practices to reduce the impact of man's activities on the watershed.

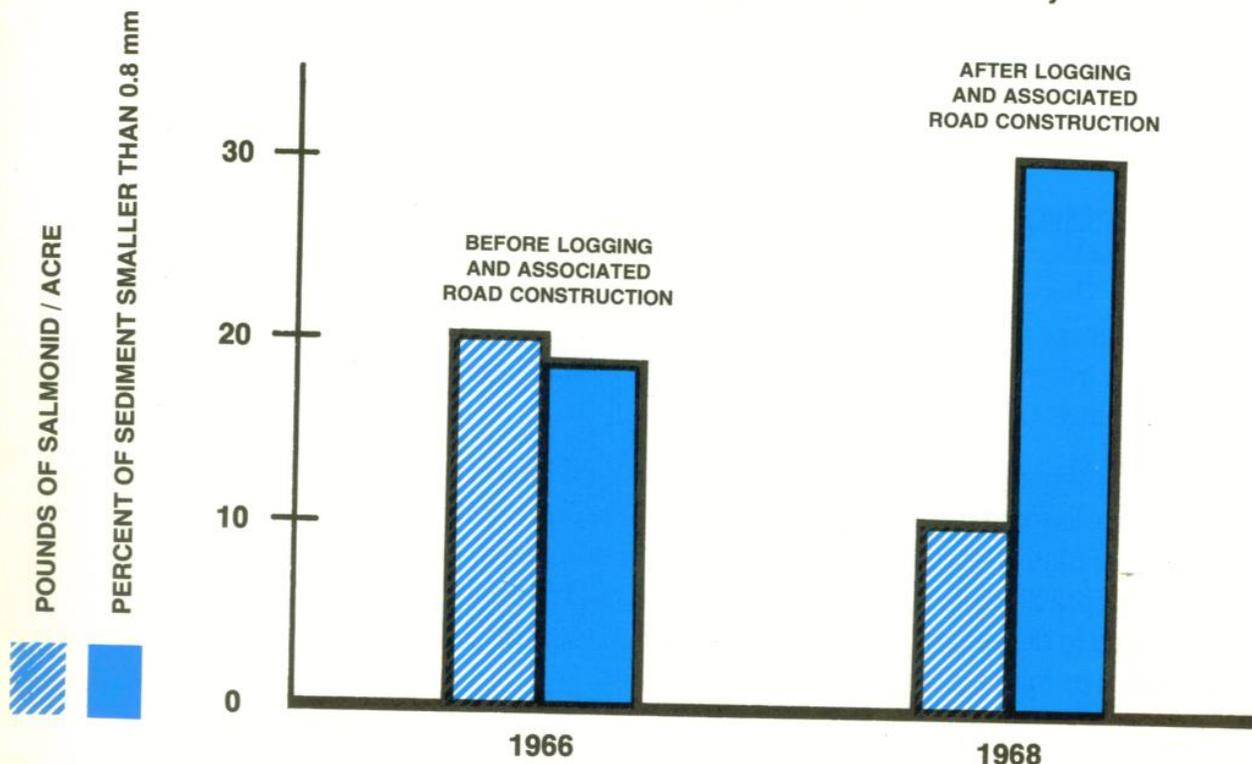
Land-Use Planning (continued)

Above all, *decision makers* need to have available a sophisticated computer-based systems analysis capacity to utilize and integrate available land-use planning data. Without some computer based decision making capacity, the decision maker will be deluged by the complexity of the very facts he must have to make good decisions. The need to develop comprehensive land-use planning capability of this sort is felt by decision makers across the country. Development will require a massive nationwide task force effort, with capabilities tailored to meet specific North Coast conditions.

There is no alternative . **The time is NOW!**

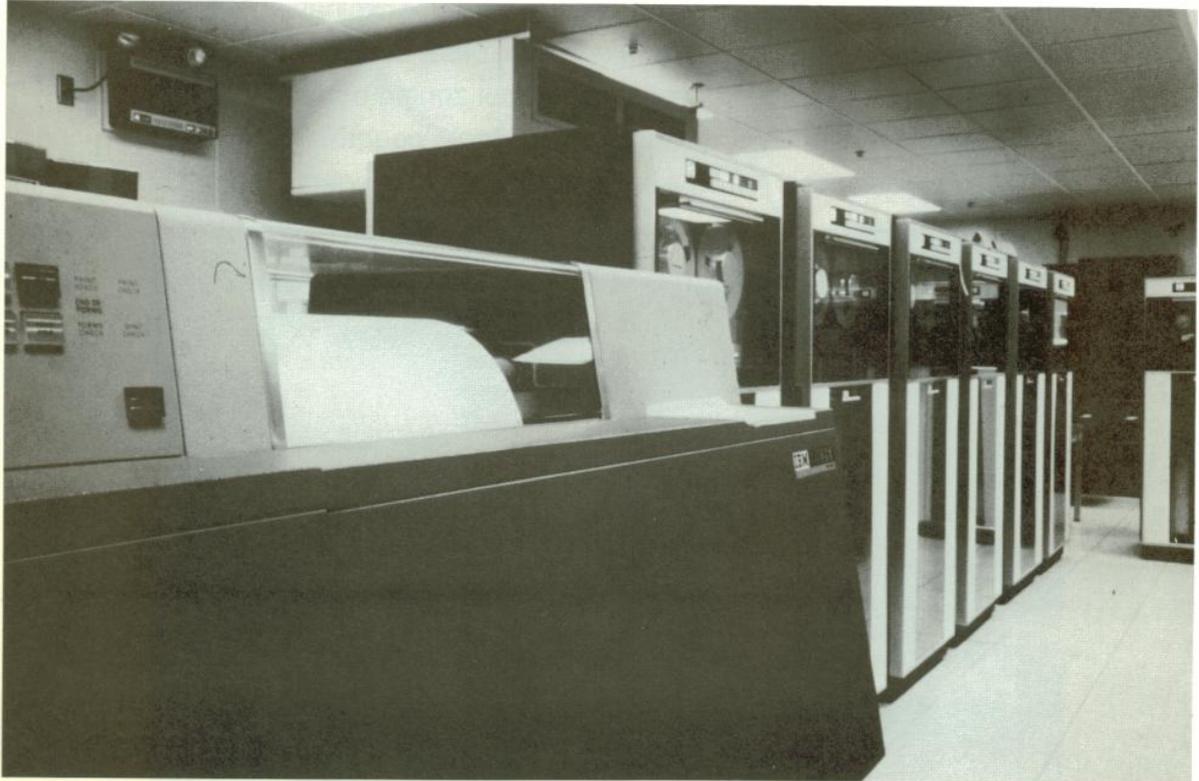
The best land-use planning will not improve the fishery resources unless "good" plans are put into practice. The decision maker must have the authority to put these plans into practice. Innovative land-use legislation must be enacted to complement land-use planning capabilities if the gap between planning and practice is to be bridged.

**EXAMPLE OF THE RELATIONSHIP BETWEEN STREAM
SEDIMENT AMOUNTS AND SALMONID FISH BIOMASS**
Little North Fork Noyo River — Mendocino County





Soil and Vegetation Surveys Provide the Information Base Necessary for Proper Land-Use Planning



Computer Facilities are Recommended for Use in Developing Land-Use Planning Capabilities



Help From Local Government

City and county planning commissions and staffs have participated to varying degrees in fostering proper land-use planning and management for the protection of salmon and steelhead fishery resources. Since they are responsible for the administration of land-use planning on a local level, their jurisdiction is a key to maintaining fish habitats and proper watershed and water quality conditions.

Planning and management techniques are available to reduce environmental impacts on habitat areas. Such methods as preventing development on steep or unstable slopes, and the use of lake or stream setbacks have been used by some counties to preserve habitats. In addition, other counties and cities have enacted open space, low density or large parcel zoning on lands that are not able to withstand intensive development. Many counties have also implemented the Williamson Act which slows land division speculation affording

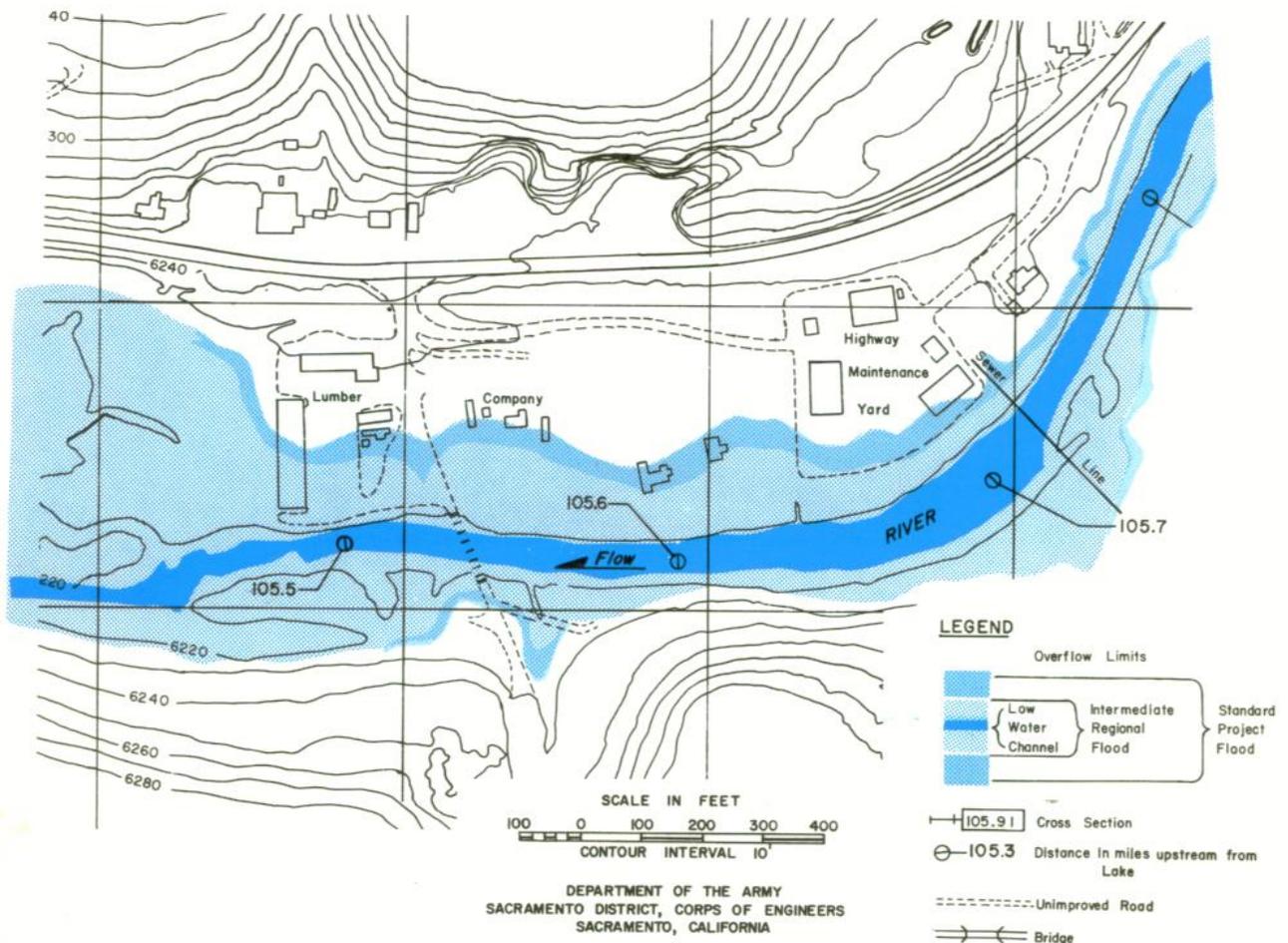


Subdivision Developments Can Induce Environmental Impacts On Fish Habitat Areas.



Planning and Management Techniques to Reduce Environmental Impacts

added protection to the fish resources. Some local governments have developed flood plain management techniques such as the regulation of development on historical flood plain areas and flood plain zoning in order to protect habitats from siltation and unsuitable leaching of effluents from nearby areas. Siltation problems may be reduced by properly administered excavation and grading ordinances. Protection of fishery resources may also be provided by the use of county fine monies for the management of these resources. Amortization periods for the abandonment of non-conforming refuse disposal sites, quarries, gravel extraction operations, and mining and manufacturing operations are being instituted in some counties on those who have ignored cease and desist orders to abate violations of regulations. County agricultural departments have been careful in issuing permits for use of insecticides and herbicides in order to reduce the adverse effect on fish habitats.



Information to Be Used for Flood Plain Management



Recommendations

Recommendations: Artificial Propagation

THE ISSUE

The efficiency of salmon and steelhead hatcheries and the contribution of the hatchery product to the fishery must be improved.

ACTION NOW!

1. The Bureau of Reclamation and the Department of Water Resources should:
 - a. Provide funds for on-the-job research at their mitigation hatcheries to reduce egg and fingerling mortality;
 - b. Provide additional pond space for rearing salmon to a desirable size for planting; and
 - c. Modernize facilities as new hatchery techniques are developed.
2. The Bureau of Reclamation should provide a recirculating water system at Nimbus Hatchery to help control Sacramento River Chinook Disease (S.R.C.D.)
3. The Department of Fish and Game and the Bureau of Sport Fisheries and Wildlife should continue and expand marking experiments to evaluate the results of various hatchery procedures. Results should be analyzed without delay and made available to all hatchery managers.
4. The Bureau of Sport Fisheries and Wildlife with assistance from the Department of Fish and Game should give high priority to the development of techniques to reduce the pre-spawning loss of female salmon in the Tehama-Colusa spawning channel and to improve overall efficiency of the channel.
5. Sea Grants or other federal funds should be sought to investigate the impact of hatchery production on native salmon and steelhead stocks.

Recommendations: **Off-Stream Rearing Ponds**

THE ISSUE

Local groups are interested in rearing surplus fingerling salmon and steelhead in off-stream rearing ponds, but lack fish cultural experience.

ACTION NOW!

1. The Department of Fish and Game should encourage the rearing of yearling salmon and steelhead by private organizations and assist by providing technical service for pond development and preparation of a management plan.
2. The Department should continue to supply surplus fingerlings, when available, after determining that the ponds meet Department of Fish and Game criteria and that fish food and labor will be supplied by the sponsoring organization. The time and place of fish planting should be determined by the Department.

Recommendations: Delta Water Problems

THE ISSUE

The lack of certain essential design and operating criteria for the proposed Peripheral Canal is a potential threat to salmon, steelhead and shad populations.

ACTION NOW!

1. The Department of Water Resources and the U.S. Bureau of Reclamation should take the following action related to the Peripheral Canal:
 - a. Initiate a fish screen research and development program for the Peripheral Canal with an adequate budget and a staff of experts so that a screen design can be developed which will guarantee the protection of juvenile anadromous fish. The possibility of engaging one of the aerospace firms to assist in this endeavor should be explored;
 - b. Provide funds and engineering support for an investigation to determine the rate of downstream movement of juvenile salmon and steelhead under present flow and water export conditions;
 - c. Plan and fund post-project studies to establish minimum flow schedules for the river below the canal intake and provide sufficient operating flexibility to permit adjustments if needed;
 - d. Plan and fund a post-project study of the effect of water releases from the canal on salmon and steelhead migration;
 - e. Investigate the possibility of obtaining San Joaquin River water in lieu of canal releases for water quality control in the South Delta in September; and

THE ISSUE

The lack of certain essential design and operating criteria for the proposed Peripheral Canal is a potential threat to salmon, steelhead and shad populations.

ACTION NOW!

- f. Plan the operation of the Delta Cross Channel so there will be no interference with salmon and steelhead migrations.
2. The Department of Fish and Game should plan and fund an investigation to determine the environmental requirements of the American shad, a species threatened by water development.
3. Federal and State legislation should be enacted to prohibit additional water development of North Coast salmon and steelhead streams that would adversely affect the anadromous fishery.

Recommendations: **Water Projects Operations**

THE ISSUE

Water development projects have been constructed by Federal, State and local agencies with no provision for post-project evaluation and modification if necessary to protect salmon and steelhead.

ACTION NOW!

1. Federal and State legislation authorizing water projects must provide funds for determining project effects on the fishery and for making such adjustments as may be necessary. This must include adequate pre-project and post-project studies.
2. Federal and State laws should be enacted to provide that water development agencies have a continuing responsibility for the maintenance and enhancement of fish and wildlife for the life of the project.
3. The State Water Resources Control Board should condition water permits to allow for modification of permit terms if project evaluation studies demonstrate that such changes are essential to protect the fishery.

Recommendations: Land-Use Planning

THE ISSUE

Land-use planning and practices of a total watershed have a direct impact upon the salmon and steelhead resources of the area.

ACTION NOW!

1. Appropriations of adequate federal and state general funds are needed to:
 - a. Expand and intensify the current cooperative State-Federal Soil Vegetation Survey to provide the resource information base needed for planning;
 - b. Expand and intensify studies of relationships between fish resources and their habitats and between stream turbidity and sport fishing success;
 - c. Fully fund studies to develop new and efficient stream rehabilitation practices;
 - d. Establish an adequate flow and sediment monitoring network on North Coast streams;
 - e. Fully fund development of alternate logging methods; and
 - f. Fully fund an integrated State-Federal task force to develop systems analysis technology to enhance the decision making process for future land-use planning.
2. There should be established an advisory committee to the California State Legislature to develop and recommend new and innovative land-use legislation.
3. Full implementation of multipurpose management of federal and state lands must be provided by more adequate federal and state general funds.
4. The State must enact legislation to control the conversion of timber land to grassland. Such legislation should include additional methods of taxation or other economic means to

THE ISSUE

Land-use planning and practices of a total watershed have a direct impact upon the salmon and steelhead resources of the area.

ACTION NOW!

control this conversion and therefore reduce the resulting degradation of watersheds. Congress and the Legislature must also appropriate adequate federal and state funds to continue the conversion of grassland to timber on federal and state lands.

5. The State Lands Commission must be provided with additional state general funds to comply with recently enacted legislation requiring the identification of state-owned spawning and nursery areas important to salmon and steelhead resources.

State legislation must be passed to *acquire, protect, restore* and *preserve* critical spawning and nursery areas.

6. The California Division of Forestry must strictly enforce the State Forest Practices Act to control sediment production from specific timber harvesting operations. Funds for increased enforcement procedures should be supplied by additional state general funds.

Through the State Forest Practices Act of 1973, the Coast District Forest Practices Rules Committee must provide for a more comprehensive timber harvesting plan. A more comprehensive plan would include the establishment of adequate protective streamside buffer zones or green strips along all anadromous fish streams and tributaries on private or state lands.

7. Although the State Forest Practices Act of 1973 was established to control degradation of the habitat from

Land-Use Planning (continued)

THE ISSUE

Land-use planning and practices of a total watershed have a direct impact upon the salmon and steelhead resources of the area.

ACTION NOW!

individual or localized potential sediment sources, the State Legislature should provide more stringent controls in the Act for area-wide or watershed coordination to reduce total sediment production.

- a. Federal and state general funds are required for adequate research into the annual allowable timber cut for an area or watershed.
 - b. Legislation is also needed to provide controls on locations and timing of logging operations for a given watershed on private or state lands.
8. The Forest Practices Act of 1973 should be amended to provide the Department of Fish and Game with the responsibility for timely review of timber harvesting plans. These additional non-reimbursable responsibilities must be funded from sources other than the Fish and Game Preservation Fund.
 9. Congress and the Legislature should provide authority and funding to those agencies associated with land-use planning functions to develop increased inter-agency and interdepartmental cooperation in the planning process.
 10. Land-use planning, habitat protection, non-game programs, rare and endangered species protection, and exotic species control are areas of Department involvement that are currently funded by the license buyers. It is essential that some way be found to provide general fund support for these Department programs.

Recommendations:

Help From Local Government

THE ISSUE

Local governments possess the authority and jurisdiction to implement proper land-use planning and management.

ACTION NOW!

1. County and city zoning ordinances (a key tool in land-use planning) should be enforced and developed to control land-use and management for proper reduction of sediment yield. This would include the need for local governments to create primary and secondary flood plain districts to provide land-use regulations to properties situated in floodways and to provide for flood plain zoning where necessary.
2. Stream siltation and watershed erosion damage need to be minimized by more strictly enforced local excavation, grading and road-building ordinances, as well as local subdivision and lot split ordinances.
3. State general funds should be provided to develop more rigorous and mandatory review, approval and recommendation procedures by state agencies, such as the Department of Fish and Game. These procedures should be used by the Department in the decision-making process in helping to formulate local land-use plans. This would provide the Department with authority to regulate land-use practices such as logging and road construction activities to protect fishery habitats.
4. Local Department of Fish and Game personnel should continue to recognize the importance of their environmental management responsibilities in addition to their fish management functions. This will insure close coordination between fish and

Help From Local Government (continued)

THE ISSUE

Local governments possess the authority and jurisdiction to implement proper land-use planning and management.

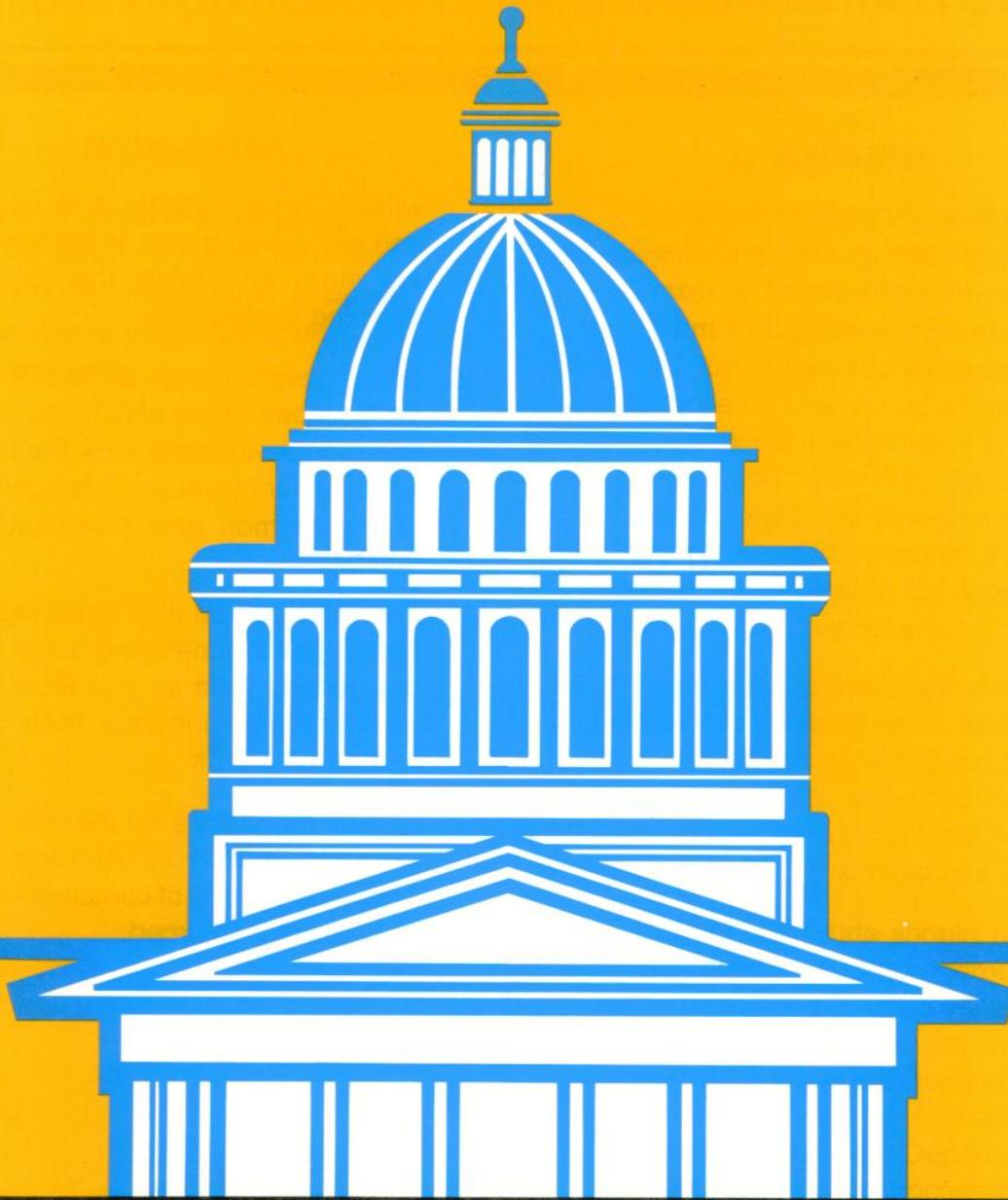
ACTION NOW!

wildlife professionals and county and city governments in implementing more effectively the existing planning procedures.

5. Local governments should review the counties' share of fish and game fine monies to make sure the funds are used for the proper management of the salmon and steelhead resources.

The State should also enact legislation to provide matching funds from the general fund so that local government can enhance their fish-related programs.

6. County regulations for the use of insecticides and herbicides and proper discarding of containers need to be strictly enforced.



Committee Activities

SUMMARY OF RECOMMENDATIONS AND LEGISLATIVE ACTIONS FROM AN ENVIRONMENTAL TRAGEDY REPORT

Recommendations

The Federal Government should pay the costs for restoration of salmon and steelhead runs damaged by prior federal water and other development projects, as is being done in the Columbia River Basin.

The California general fund should contribute half the costs of Department of Fish and Game programs to rehabilitate and restore the salmon and steelhead resources already damaged by non-Federal Governmental agencies and private developments.

The Federal Government, at Coleman and Nimbus Hatcheries, should install a closed water system and take those actions necessary to prevent disease now causing losses of up to 90 percent of the hatchery production of salmon and steelhead.

Additional ponds should be installed at both hatcheries by the Federal Government to increase the rearing capacity for salmon and steelhead, thereby allowing the fish to be reared to a larger size and increasing their survival to the adult stage. These hatcheries have not yet accomplished their purpose of fully mitigating damages caused by federal water development.

The Federal Government should make the necessary alterations in the design or operation of the Keswick Fish Trap to assure its efficient functioning at the time of all salmon runs.

Immediate priority should be given to an evaluation of the U.S. Bureau of Reclamation's Trinity River Project and correction of the tremendous damage done to the steelhead-salmon runs in this river in the last ten years. Steelhead runs since 1961 under project-controlled downstream spring flows have declined 82 percent.

The Department of Fish and Game must recognize the failure of fish protection measures at the Trinity River Project and must actively oppose any future project on any salmon or steelhead stream until the deficiency in technology demonstrated on the Trinity River has been overcome.

Legislative Actions

SJR 29 (Marler) memorializes Congress to direct the Secretary of Interior to correct deficiencies in existing Central Valley Project fish facilities at Coleman Hatchery, Nimbus Hatchery and Keswick Fish Trap.

Recommendations

A minimum of \$3 million of State Water Project Fish and Wildlife Enhancement funds authorized by Proposition 20 (1970) shall be allocated for salmon and steelhead enhancement purposes for projects such as spawning gravel acquisition, hatcheries or artificial spawning channels.

The U.S. Corps of Engineers should issue no permits for waste discharges to any California salmon and steelhead stream under the National Refuse Act of 1899 without first making a finding that such discharge will have no deleterious effect on the salmon and steelhead resources of that stream.

The Department of Fish and Game shall aggressively oppose any planned developments on salmon and steelhead streams unless it can be demonstrated in an impact report that these resources can be fully protected or enhanced with the proposed development.

Federal and State pumping of water in the Delta now threatens the salmon and steelhead resources in the Central Valley. Additional scheduled pumping will pose an even greater threat. The Peripheral Canal project can solve these problems if operated properly. The responsible water development agencies should be required to take those interim measures already recommended by the Department to avoid further damage prior to project completion.

All future water diversions from streams designated by the Department of Fish and Game as salmon and steelhead spawning streams shall be screened as directed by the Department and the entire cost of constructing, maintaining and operating the screen shall be borne by the diverter.

The primary project beneficiaries of all future water, power, irrigation or flood control projects, shall bear the full costs of all actions required to provide for the maintenance of the full salmon and steelhead production capability of such streams, including the acquisitions, improvement and maintenance of downstream spawning areas. The effects on salmon and steelhead of changes in water quality, temperatures, stream flows, gravel replenishment and increased use of the stream as a result of the project shall be considered in assessing the project impact.

Legislative Actions

AB 2637 (Belotti) directed the Department of Fish and Game to inform the Fish and Game Commission of the state's comments including those of the Department on all environmental impact statements or reports of possible projects which affect salmon and steelhead resources.

AB 2147 (Davis) required all new diversions from salmon and steelhead streams to be screened by the diverter if the Department determines the diversion could be detrimental to salmon and steelhead. All construction and maintenance costs would be borne by the diverter.

Recommendations

Downstream releases of water made for salmon and steelhead from any project shall be safeguarded by the State Water Resources Control Board from diversion for other purposes.

The State Lands Commission shall determine the ownership of all salmon and steelhead spawning areas designated by the Department of Fish and Game. All areas found to be the State property shall be permanently protected by the State and no sale, lease, or disposal shall be made. The Director of the Department of Fish and Game shall be empowered to disapprove stream alterations of any prime salmon and steelhead spawning areas.

The Federal Government should annually provide the maximum funding allowed under the Federal Anadromous Fisheries Act providing allocations to the states for salmon and steelhead management programs.

Post project evaluation of all future water developments shall be financed by the developer to determine the actual effect of project operations on salmon and steelhead populations. Project operations should be adjusted where necessary to assure pre-project fish production. Artificial hatchery production should be provided if changes in project operation cannot accomplish this goal.

Sport fishing license fees for the taking of salmon and steelhead should be increased to provide additional funds for the protection, restoration and enhancement of salmon and steelhead. Taxes on the commercial take of salmon were increased in 1970. The Department should maintain separate accounting of all the revenues and expenditures for salmon and steelhead.

The Federal Council on Environmental Quality should disapprove any proposed federal project on any California salmon and steelhead stream unless the environmental impact statement clearly states that such projects will not be deleterious to the salmon and steelhead resources of that stream.

Legislative Actions

SB 1215 (Marler) required the State Lands Commission to determine the ownership of salmon spawning areas in Central Valley rivers. While the ownership is being determined, the Director of the Department of Fish and Game may disapprove any streambed alteration if such work would be deleterious to fish life. Spawning beds which are found to be state property would not be disposed of or leased. However, the Director may allow easements of leases for public utility facilities.

AJR 27 (Belotti) requests the President and Congress to annually provide maximum funding under the Federal Anadromous Fisheries Act.

AJR 40 (Dunlap) memorializes the Federal Council on Environmental Quality to disapprove any proposed federal project unless the environmental impact statement clearly demonstrates that the project will not have a substantial deleterious effect on salmon and steelhead. The Corps of Engineers was requested to take similar action regarding the issuance of waste discharge permits.

Recommendations

The following additional legislation not recommended in the report was passed:

Legislative Actions

SCR 64 (Collier) directs the Department of Fish and Game to develop a series of reports on programs to restore salmon and steelhead populations which have been depleted or destroyed because of federal water development projects.

SCR 72 (Collier) directs the Department of Fish and Game to prepare plans to enhance Feather River salmon and steelhead populations in conjunction with the operation of the State Water Project. The costs of such plans would be payable from the Recreation and Fish and Wildlife Enhancement Fund.

SB 887 (Collier) failed.

SUMMARY OF RECOMMENDATIONS AND LEGISLATIVE ACTIONS FROM A CONSERVATION OPPORTUNITY REPORT

Recommendations

Amend the Federal Water Project Recreation Act to provide that all project and operational costs for anadromous fish enhancement programs in conjunction with federal water projects shall be borne by the federal government.

Amend the Federal Water Project Recreation Act to remove the \$100,000 ceiling on the cost of measures which may be taken by the Secretary of Interior to include anadromous fishery improvements at projects authorized prior to 1965 where no such improvements were included in the original plan of development. Broaden the authority to apply anywhere in the project impact area.

Amend the Anadromous Fisheries Act to increase the federal grant from 50 to 75 percent of project costs and to increase the annual expenditure authorization from \$5 million to \$20 million. Additionally, provide that such grants may be utilized within two years, rather than one year, of their allocation date.

Legislative Actions

The Flood Control Act of 1974 changed the 50/50 provision for fish and wildlife enhancement to 75 percent Federal funding.

P.L. 93-362 extended the Act through June 30, 1979 and increased annual expenditure authorization to \$20 million. The Act adds control of sea lamprey to eligible activity and increases federal participation to 66 $\frac{2}{3}$ percent for projects jointly entered into by two or more states.

Recommendations

Amend the Federal Power Act to subject federal agencies to its licensing provisions, in order to assure adequate, continuing project responsibility to fisheries protection.

Obtain congressional approval for a Central Valley fishery rehabilitation program granting the Secretary of Interior specific authority to undertake projects for the restoration of salmon and steelhead resources heretofore damaged through the development of Central Valley water projects under the control of the Secretary.

Amend the Forest Practice Act to require the preparation of detailed logging plans to be approved by the Department of Fish and Game. A streamside buffer strip should be a requirement in the law to protect all salmon and steelhead streams. The Act should also require adequate monitoring and enforcement to assure total stream protection.

Amend the Water Code to provide that streamflows required for the preservation of fisheries are not subject to further appropriation.

Amend the Fish and Game Code to extend the Department's authority over critical streambed spawning areas to key North Coast and Central Valley streams where such authority is now lacking.

Direct the Commission and Department to seek conditions in all future power licenses, water permits and similar grants of public authority to require project agencies to be responsible for fish and wildlife throughout the life of the project. They should finance pre- and post-construction studies of fishery conditions and make project amendments, where needed. Such project-agency responsibilities should not terminate until all parties have determined the fisheries to be successfully protected.

Legislation should be passed to clearly establish a general fund responsibility for the protection, restoration and enhancement of the salmon resources related to commercial fisheries. Such a contribution should be viewed as an investment to the present and future economy of the State.

Legislative Actions

New Forest Practice Act enacted providing for public membership on the Board. Recommendations for fish and wildlife protection have been submitted to the Board for possible inclusion in new Rules.

Proposed legislation withheld by author.

Section 1505, Fish and Game code, amended to give the Department of Fish and Game authority over specified activities in spawning areas, including major North Coast streams.

Under legislative investigation.



ACTIVITIES OF THE DEPARTMENT OF FISH AND GAME



The following is a partial listing of salmon and steelhead activities and programs undertaken by the Department of Fish and Game since publication of the Advisory Committee's first report in March of 1971. Some of the efforts were generated by Committee action, many were not. Nonetheless, the Committee recognizes the value of all of these programs in achieving the goals outlined in its three reports to the California Legislature:

1. Developed and implemented a cooperative program to operate salmon and steelhead hatcheries at capacity.
2. Developed and implemented a program of increasing hatchery contribution through improved rearing and downstream release of appropriate numbers of hatchery produced juveniles.
3. Completed a program of screening eight major water diversions on salmon and steelhead streams at a total cost of nearly 3.5 million dollars.
4. Initiated a program of identifying and setting priorities for screening those diversions which are now unscreened and which are causing significant mortalities.
5. Initiated a tagging study to measure any mechanically caused mortality associated with louver screen facilities in the Sacramento-San Joaquin Delta.
6. Conducted an investigation to determine the size and timing of juvenile salmon migration past the intake site of the proposed Peripheral Canal.
7. Contracted for spawning area ownership surveys on the Feather River and constructed additional natural spawning area on this stream.

ACTIVITIES OF THE DEPARTMENT OF FISH AND GAME

8. Expanded the yearling salmon rearing program on the Merced River.
9. Initiated a research program to determine effects of Red Bluff Diversion Dam on upper Sacramento River salmon and steelhead runs.
10. Conducted two years of monitoring of experimental regulation of commercial silver salmon fishery.
11. In cooperation with Oregon Fish Commission and Pacific Marine Fisheries Commission, initiated development of a plan for coastwide management of silver salmon.
12. Provided technical assistance and over 1.5 million juvenile salmon and steelhead to groups participating in off-stream rearing programs.
13. Initiated a research program to develop methods of increasing coastal steelhead runs.
14. Completed a population and angler use survey of steelhead resources of the Sacramento River.
15. Initiated an experimental program to determine the value of summer steelhead to California anglers.
16. Developed a source of steelhead eggs and juveniles at Mad River Hatchery.
17. Initiated a study to determine the value of increased spring outflow to steelhead populations in the Trinity River.
18. Achieved modifications to angling regulations designed to provide additional protection to juvenile steelhead.
19. Submitted four reports to the Legislature dealing with federal water projects which have adversely affected salmon and steelhead resources.
20. Expended approximately one million dollars on environmental protection of spawning and nursery habitat of anadromous fish.
21. Initiated an experimental program to establish a fishery for silver salmon in Southern California ocean waters.

CREDITS

Photographs

Front Inside Cover	Shasta-Cascade Wonderland Association
6	John F. Pedroarena, EA & RP
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13	Lazio's Sea Foods — Eureka
14	California Department of Fish & Game
18	Sacramento Bee
19	L. B. Boydstun
21	U.S. Bureau of Reclamation
22	U.S. Bureau of Reclamation
23	U.S. Bureau of Reclamation
25	Sam Mitchell
27	California Department of Fish & Game
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34	U.S. Bureau of Reclamation
35	California Department of Fish & Game
37	California Department of Fish & Game
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